



Diplomado De Profundización Cisco

Prueba De Habilidades Practicas Ccna

Daniel Humberto Sogamoso Cuervo

Código: 11685435

Grupo: 203092_3

Tutor: Efrain Alejandro Perez

Universidad Nacional Abierta Y A Distancia Unad

Escuela De Ciencias Básicas, Tecnología E Ingeniería Ecbti

Programa De Ingeniería De Sistemas

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Introducción

A continuación, se presenta el desarrollo de los ejercicios pertenecientes a la prueba final de habilidades prácticas para el diplomado de profundización Cisco, donde logramos diseñar e implementar soluciones a diferentes escenarios para la configuración de redes, mediante el uso de una excelente herramienta de simulación, Cisco Packet Tracer.

Para dar solución al problema planteado usamos diferentes elementos de interconexión simulados, como los son switches, routers, Pc, etc. logrando desarrollar la actividad y culminar los objetivos planteados, basados en obtener una solución de conexión y habilitar los servicios necesarios de una red.



Resumen

En este trabajo se plantea el desarrollo de una actividad, que consiste en dar solución a un problema establecido como examen final de habilidades prácticas para el diplomado de profundización en el manejo de redes, este problema consiste en administrar una red de una empresa, la cual posee tres sucursales ubicadas geográficamente distantes, y se hace necesario poder interconectar dentro la red cada uno de los dispositivos que forman parte de la empresa.

Esta actividad se debe desarrollar siguiendo los lineamientos establecidos para el direccionamiento IP, protocolos de enrutamiento y demás aspectos que forman parte de la topología de red.



Objetivos

1. Objetivo General

Desarrollar satisfactoriamente la prueba de habilidades practica del Diplomado de profundización Cisco, mediante la utilización de las competencias y habilidades adquiridas a lo largo del diplomado.

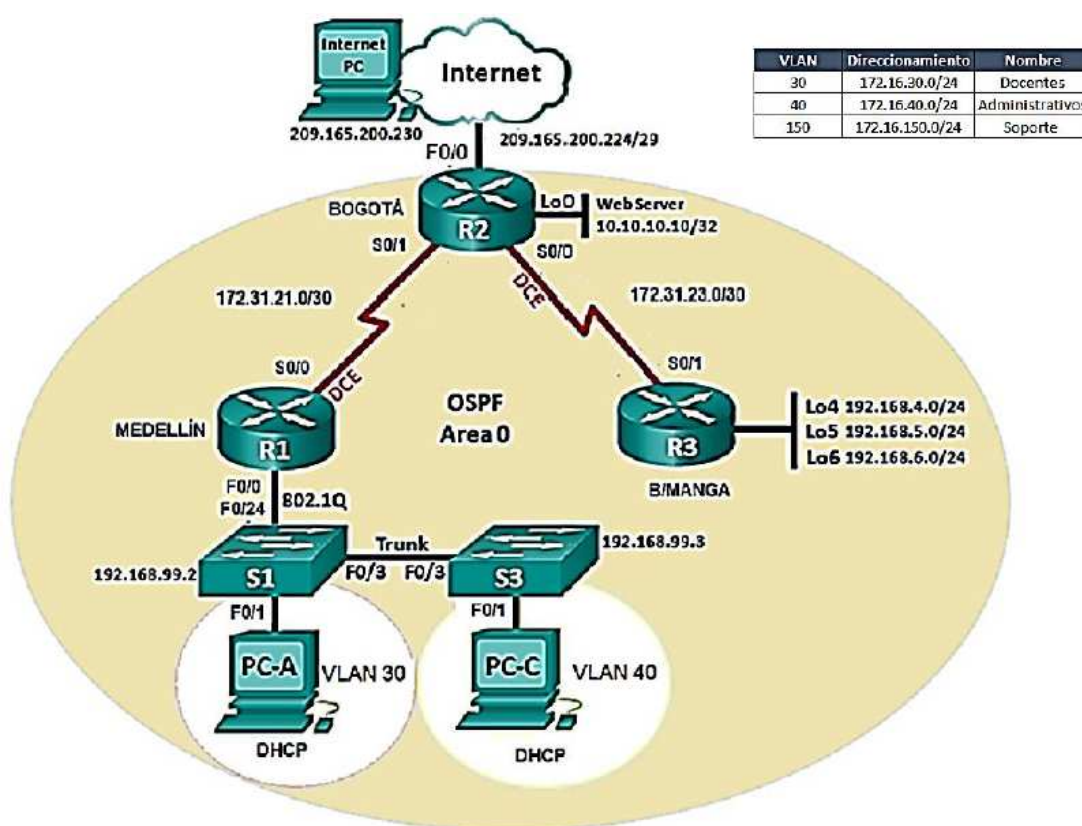
1.1. Objetivos Específicos

- Realizar la interconexión de los dispositivos pertenecientes a la red de la empresa la cual se está administrando.
- Configurar los protocolos de enrutamiento OSPF.
- Cumplir con la conectividad mediante el uso de comandos ping, traceroute, show ip route, entre otros.
- Desarrollar el diseño de la topología, utilizando la herramienta de simulación Cisco Packet tracer.

Actividad Prueba De Habilidades Ccna

Descripción Del Escenario Propuesto Para La Prueba De Habilidades

Topología



1. Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario
2. Configurar el protocolo de enrutamiento OSPFv2 bajo los siguientes criterios:

OSPFv2 área 0

Configuration Item or Task	Specification
Router ID R1	1.1.1.1
Router ID R2	2.2.2.2
Router ID R3	3.3.3.3
Configurar todas las interfaces LAN como pasivas	
Establecer el ancho de banda para enlaces seriales en	128 Kb/s
Ajustar el costo en la métrica de S0/0 a	7500

Verificar información de OSPF

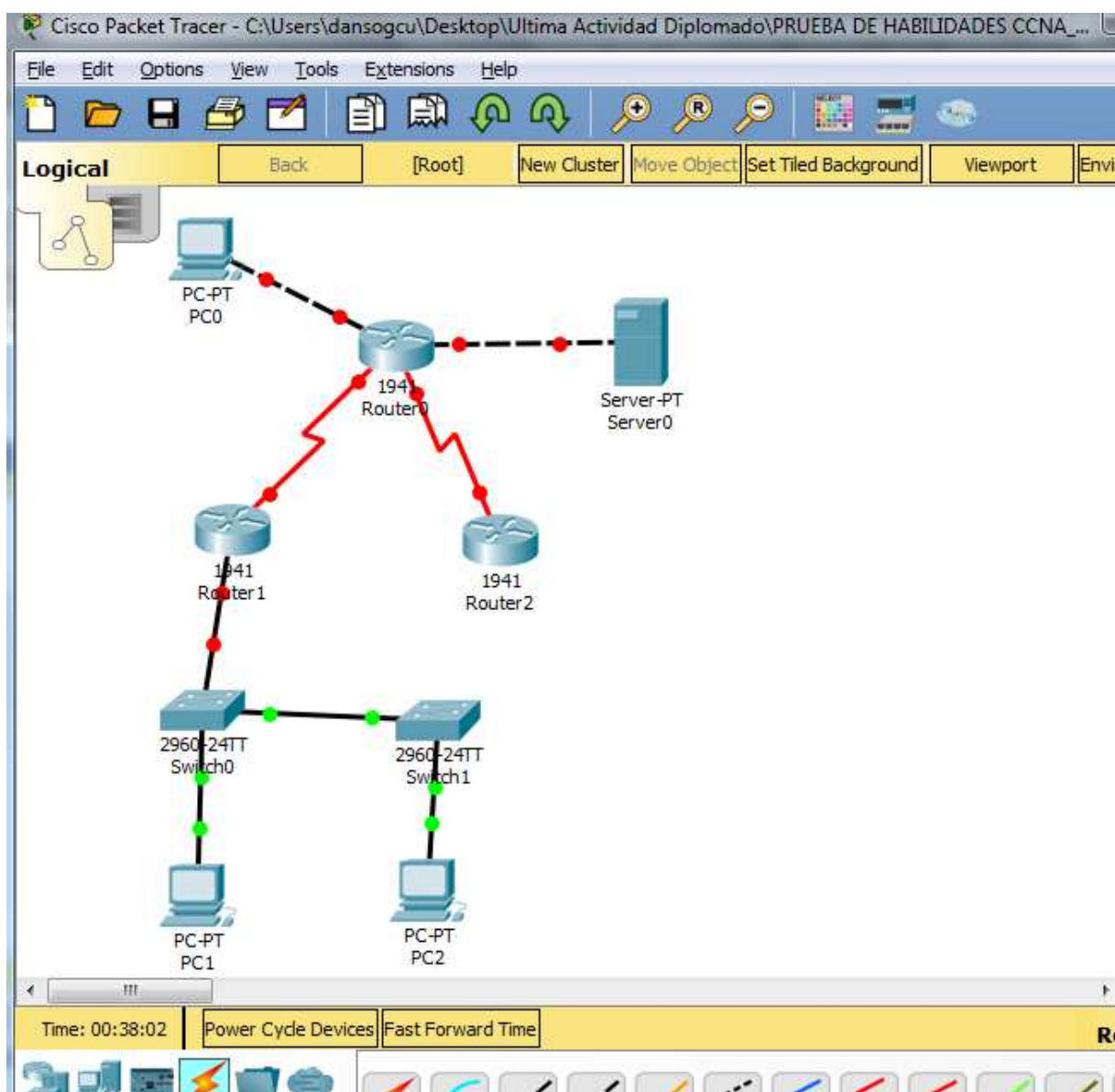
- Visualizar tablas de enrutamiento y routers conectados por OSPFv2
 - Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface
 - Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configuradas en cada router.
1. Configurar VLANs, Puertos troncales, puertos de acceso, encapsulamiento, Inter-VLAN Routing y Seguridad en los Switches acorde a la topología de red establecida.
 2. En el Switch 3 deshabilitar DNS lookup
 3. Asignar direcciones IP a los Switches acorde a los lineamientos.
 4. Desactivar todas las interfaces que no sean utilizadas en el esquema de red.
 5. Implementar DHCP and NAT for IPv4
 6. Configurar R1 como servidor DHCP para las VLANs 30 y 40.
 7. Reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas.

Configurar DHCP pool para VLAN 30	Name: DOCENTES DNS-Server: 10.10.10.11 Domain-Name: Ccna-Unad.Com Establecer Default Gateway.
Configurar DHCP pool para VLAN 40	Name: ADMINISTRATIVOS DNS-Server: 10.10.10.11 Domain-Name: Ccna-Unad.Com Establecer Default Gateway.

1. Configurar NAT en R2 para permitir que los hosts puedan salir a internet
2. Configurar al menos dos listas de acceso de tipo estándar a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.
3. Configurar al menos dos listas de acceso de tipo extendido o nombradas a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.
4. Verificar procesos de comunicación y redireccionamiento de tráfico en los routers mediante el uso de Ping y Traceroute.

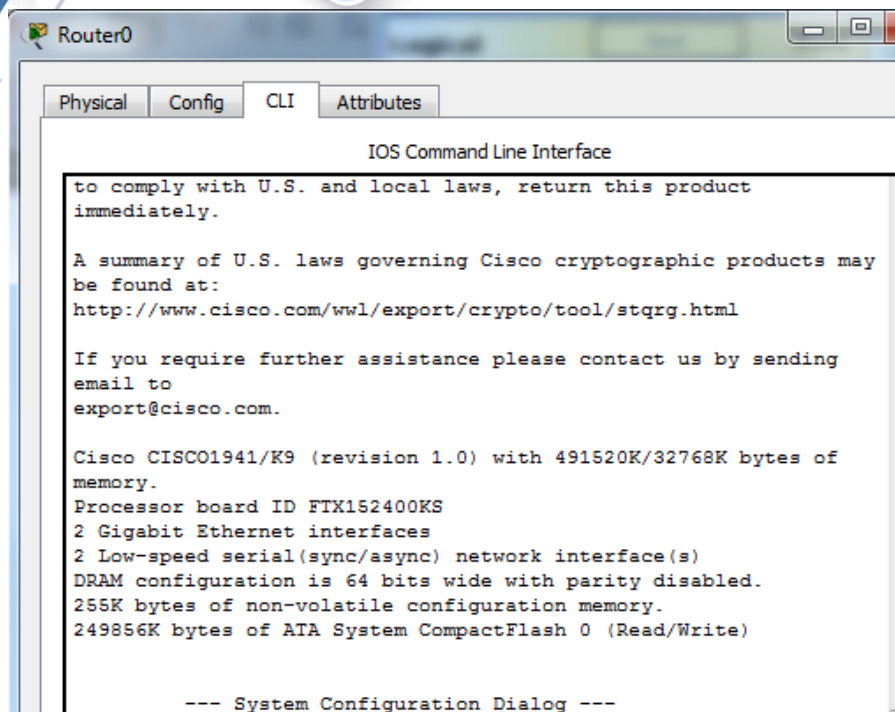
Simulación

Simulación de la topología en Cisco Packet tracer.



Topología de la red

Configuraciones



Router1

Physical Config CLI Attributes

IOS Command Line Interface

```
Router>enable
Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#reload
Proceed with reload? [confirm]
System Bootstrap, Version 15.1(4)M4, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2010 by cisco Systems, Inc.
Total memory size = 512 MB - On-board = 512 MB, DIMM0 = 0 MB
CISCO1941/K9 platform with 524288 Kbytes of main memory
Main memory is configured to 64/-1(On-board/DIMM0) bit mode with
ECC disabled

Readonly ROMMON initialized

program load complete, entry point: 0x80803000, size: 0x1b340
program load complete, entry point: 0x80803000, size: 0x1b340

IOS Image Load Test

Digitally Signed Release Software
```

Ctrl+F6 to exit CLI focus

Copy Paste

Router2

Physical Config CLI Attributes

IOS Command Line Interface

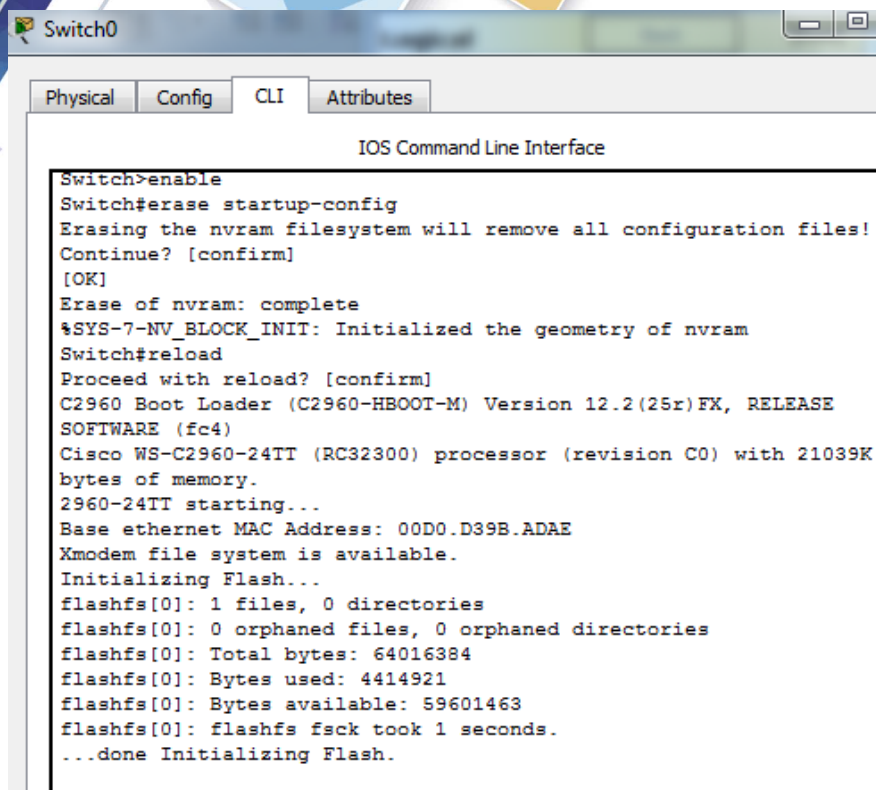
```
Router>enable
Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#reload
Proceed with reload? [confirm]
System Bootstrap, Version 15.1(4)M4, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2010 by cisco Systems, Inc.
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Readonly ROMMON initialized

program load complete, entry point: 0x80803000, size: 0x1b340
program load complete, entry point: 0x80803000, size: 0x1b340

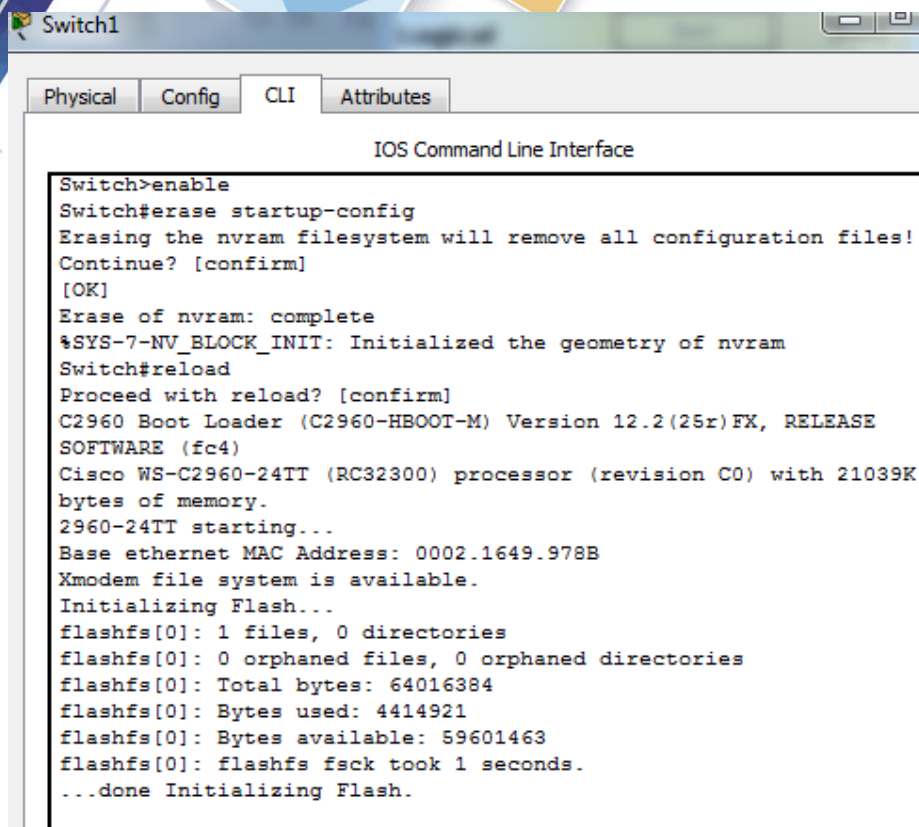
IOS Image Load Test

Digitally Signed Release Software
```



```
Switch0
Physical Config CLI Attributes
IOS Command Line Interface

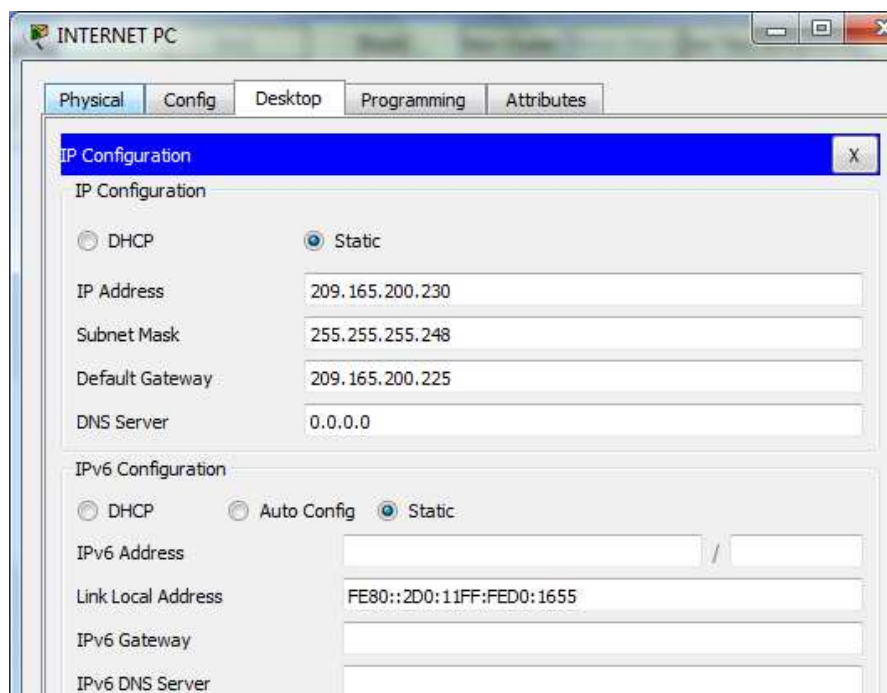
Switch>enable
Switch#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Switch#reload
Proceed with reload? [confirm]
C2960 Boot Loader (C2960-HBOOT-M) Version 12.2(25r)FX, RELEASE
SOFTWARE (fc4)
Cisco WS-C2960-24TT (RC32300) processor (revision C0) with 21039K
bytes of memory.
2960-24TT starting...
Base ethernet MAC Address: 00D0.D39B.ADAE
Xmodem file system is available.
Initializing Flash...
flashfs[0]: 1 files, 0 directories
flashfs[0]: 0 orphaned files, 0 orphaned directories
flashfs[0]: Total bytes: 64016384
flashfs[0]: Bytes used: 4414921
flashfs[0]: Bytes available: 59601463
flashfs[0]: flashfs fsck took 1 seconds.
...done Initializing Flash.
```



```
Switch1
Physical Config CLI Attributes
IOS Command Line Interface

Switch>enable
Switch#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Switch#reload
Proceed with reload? [confirm]
C2960 Boot Loader (C2960-HBOOT-M) Version 12.2(25r)FX, RELEASE
SOFTWARE (fc4)
Cisco WS-C2960-24TT (RC32300) processor (revision C0) with 21039K
bytes of memory.
2960-24TT starting...
Base ethernet MAC Address: 0002.1649.978B
Xmodem file system is available.
Initializing Flash...
flashfs[0]: 1 files, 0 directories
flashfs[0]: 0 orphaned files, 0 orphaned directories
flashfs[0]: Total bytes: 64016384
flashfs[0]: Bytes used: 4414921
flashfs[0]: Bytes available: 59601463
flashfs[0]: flashfs fsck took 1 seconds.
...done Initializing Flash.
```

Configuración PC 1 (INTERNET PC)



INTERNET PC

Physical Config Desktop Programming Attributes

IP Configuration

IP Configuration

☐ DHCP ☒ Static

IP Address: 209.165.200.230

Subnet Mask: 255.255.255.248

Default Gateway: 209.165.200.225

DNS Server: 0.0.0.0

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address: /

Link Local Address: FE80::2D0:11FF:FED0:1655

IPv6 Gateway:

IPv6 DNS Server:

Configuración Recuerdo A La Topología

Configuración R1.

```
Router1
Physical Config CLI Attributes
IOS Command Line Interface

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#host R1
R1(config)#enable secret class
R1(config)#line con 0
R1(config-line)#pass cisco
R1(config-line)#login
      ^
% Invalid input detected at '^' marker.

R1(config-line)#login
R1(config-line)#line vty 0 4
R1(config-line)#pass cisco
R1(config-line)#login
R1(config-line)#exit
R1(config)#service password-encryption
R1(config)#int s0/0/0
R1(config-if)#description conexcion a R2
R1(config-if)#ip add 172.31.21.1 255.255.255.252
R1(config-if)#clock rate 128000
This command applies only to DCE interfaces
R1(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#exit
R1(config)#ip route 0.0.0.0.0.0.0.0 s0/0/0
      ^
% Invalid input detected at '^' marker.

R1(config)#
```

Configuración R2

```
Router0
Physical Config CLI Attributes
IOS Command Line Interface

R2#config t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#no ip domain-lookup
R2(config)#host R2
R2(config)#enable secret class
R2(config)#line con 0
R2(config-line)#pass cisco
R2(config-line)#login
R2(config-line)#line vty 0 4
R2(config-line)#pass cisco
R2(config-line)#login
R2(config-line)#exit
R2(config)#
R2(config)#service password-encryption
R2(config)#banner motd #Prohibido Ingreso No autorizado#
R2(config)#int s0/0/1
R2(config-if)#description conexion a R1
R2(config-if)#ip add 172.31.21.2 255.255.255.252
R2(config-if)#no shutdown
R2(config-if)#int s0/0/0
R2(config-if)#description conexion a R3
R2(config-if)#ip add 172.31.23.1 255.255.255.252
R2(config-if)#clock rate 128000
This command applies only to DCE interfaces
R2(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R2(config-if)#exit
R2(config)#line con 0
R2(config-line)#exit
R2(config)#int g0/0
R2(config-if)#description conexion a ISP
R2(config-if)#ip add 209.165.200.225 255.255.255.248
R2(config-if)#no shutdown

R2(config-if)#int g0/1
R2(config-if)#description conexion a web server
R2(config-if)#ip add 10.10.10.1 255.255.255.0
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to
up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/1, changed state to up

R2(config-if)#
```


Configuración R3

```

R3
Physical Config CLI Attributes
IOS Command Line Interface

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#enable secret class
R3(config)#line con 0
R3(config-line)#pass cisco
R3(config-line)#login
R3(config-line)#line vty 0 4
R3(config-line)#pass cisco
R3(config-line)#login
R3(config-line)#exit
R3(config)#service password-encryption
R3(config)#banner motd #Prohibido Ingreso No autorizado#
R3(config)#int s0/0/1
R3(config-if)#description conexcion a R2
R3(config-if)#ip add 172.31.23.2 255.255.255.252
R3(config-if)#no shutdown

R3(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1,
changed state to up

R3(config-if)#int loopback 4

R3(config-if)#
%LINK-5-CHANGED: Interface Loopback4, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4,
changed state to up

R3(config-if)#ip address 192.168.4.1 255.255.255.0
R3(config-if)#int loopback 5

R3(config-if)#
%LINK-5-CHANGED: Interface Loopback5, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback5,
changed state to up

R3(config-if)#ip address 192.168.5.1 255.255.255.0
R3(config-if)#int loopback 6

R3(config-if)#
%LINK-5-CHANGED: Interface Loopback6, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback6,
changed state to up

R3(config-if)#ip address 192.168.6.1 255.255.255.0
R3(config-if)#exit
R3(config)#ip route 0.0.0.0 0.0.0.0 s0/0/1
  
```

Configuración Web Server

The screenshot shows a 'WEB SERVER' configuration window with tabs for Physical, Config, Services, Desktop, Programming, and Attributes. The 'Config' tab is active, displaying 'IP Configuration' and 'IPv6 Configuration' sections.

IP Configuration

- ☐ DHCP
- ☒ Static
- IP Address: 10.10.10.10
- Subnet Mask: 255.255.255.0
- Default Gateway: 10.10.10.1
- DNS Server: 0.0.0.0

IPv6 Configuration

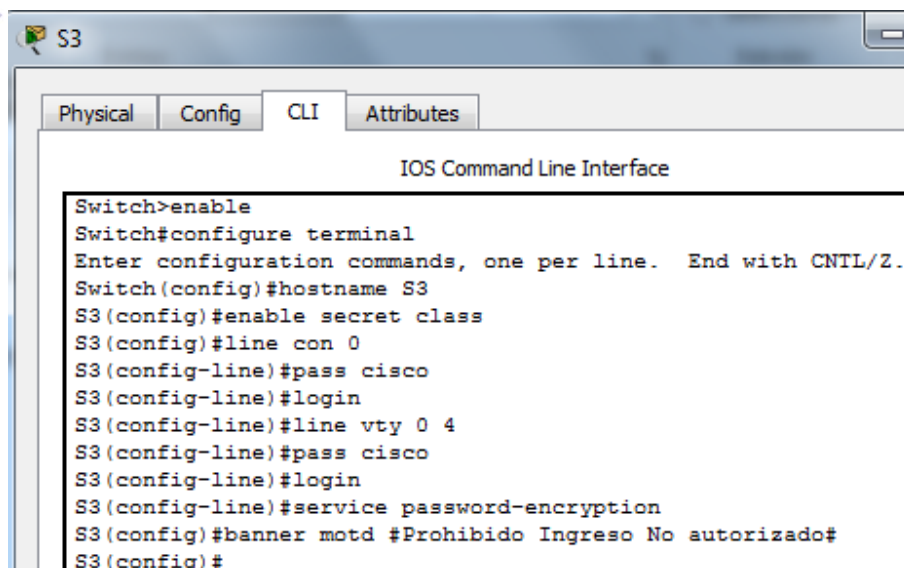
- ☐ DHCP
- ☐ Auto Config
- ☒ Static
- IPv6 Address: [Empty field] / [Empty field]
- Link Local Address: FE80::260:47FF:FE36:AC6C
- IPv6 Gateway: [Empty field]
- IPv6 DNS Server: [Empty field]

Configuración S1

The screenshot shows the 'S1' configuration window with tabs for Physical, Config, CLI, and Attributes. The 'CLI' tab is active, displaying the 'IOS Command Line Interface'.

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#enable secret class
S1(config)#line con 0
S1(config-line)#pass cisco
S1(config-line)#login
S1(config-line)#line vty 0 4
S1(config-line)#pass cisco
S1(config-line)#login
S1(config-line)#service password-encryption
S1(config)#banner motd #Prohibido Ingreso No autorizado#
S1(config)#
```

Configuración S3

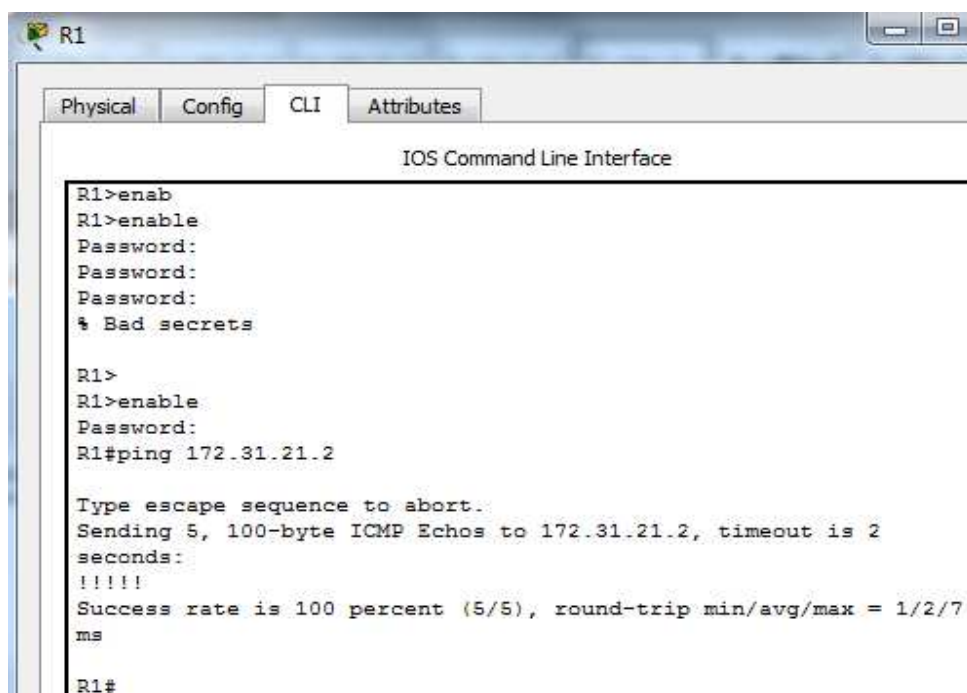


```

Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S3
S3(config)#enable secret class
S3(config)#line con 0
S3(config-line)#pass cisco
S3(config-line)#login
S3(config-line)#line vty 0 4
S3(config-line)#pass cisco
S3(config-line)#login
S3(config-line)#service password-encryption
S3(config)#banner motd #Prohibido Ingreso No autorizado#
S3(config)#
  
```

Verificación De Conectividad En La Red

Ping de R1 a R2



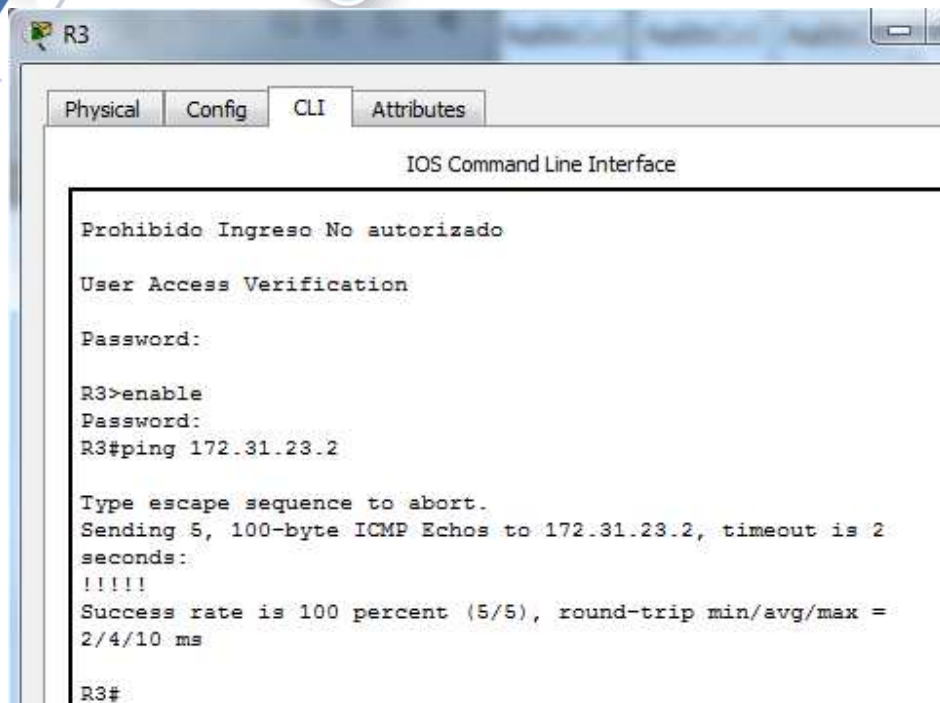
```

R1>enab
R1>enable
Password:
Password:
Password:
% Bad secrets

R1>
R1>enable
Password:
R1#ping 172.31.21.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.21.2, timeout is 2
seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/7
ms
R1#
  
```

Ping de R3 a R2



```

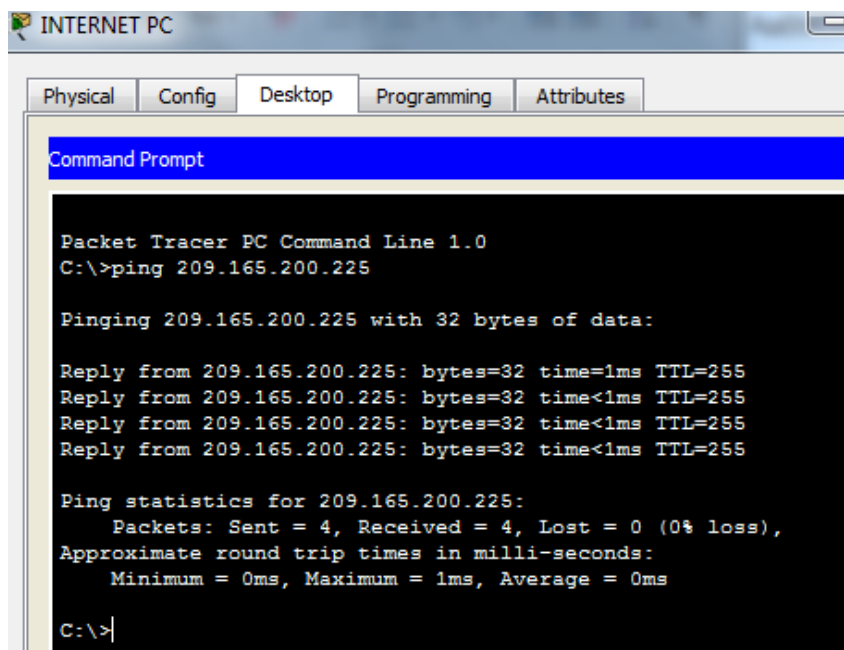
R3
Physical Config CLI Attributes
IOS Command Line Interface

Prohibido Ingreso No autorizado
User Access Verification
Password:

R3>enable
Password:
R3#ping 172.31.23.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.23.2, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max =
2/4/10 ms
R3#
  
```

Ping desde Internet PC a Puerta de Enlace Predeterminada



```

INTERNET PC
Physical Config Desktop Programming Attributes
Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 209.165.200.225

Pinging 209.165.200.225 with 32 bytes of data:

Reply from 209.165.200.225: bytes=32 time=1ms TTL=255
Reply from 209.165.200.225: bytes=32 time<1ms TTL=255
Reply from 209.165.200.225: bytes=32 time<1ms TTL=255
Reply from 209.165.200.225: bytes=32 time<1ms TTL=255

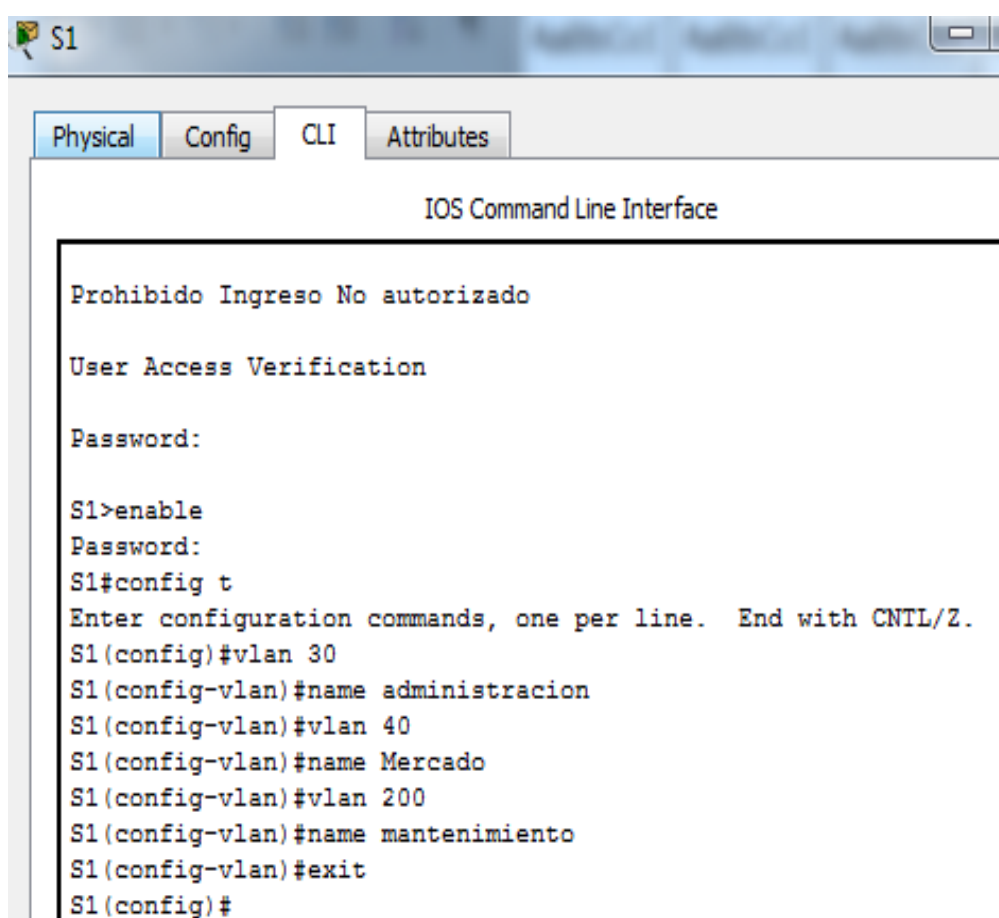
Ping statistics for 209.165.200.225:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
  
```


Configuración De Switch Security, Vlans E Inter Vlan Routing

Tareas de configuración para S1 incluyendo: Crear la base de datos VLAN, asignar la dirección IP de administración, asignar la puerta de enlace predeterminada, forzar la conexión troncal en la interfaz F0/3, forzar la conexión troncal en la interfaz F0/24, configurar todos los demás puertos como puertos de acceso, asignar F0/1 a la VLAN 30, apagar todos los puertos no utilizados.

Configuración S1



```

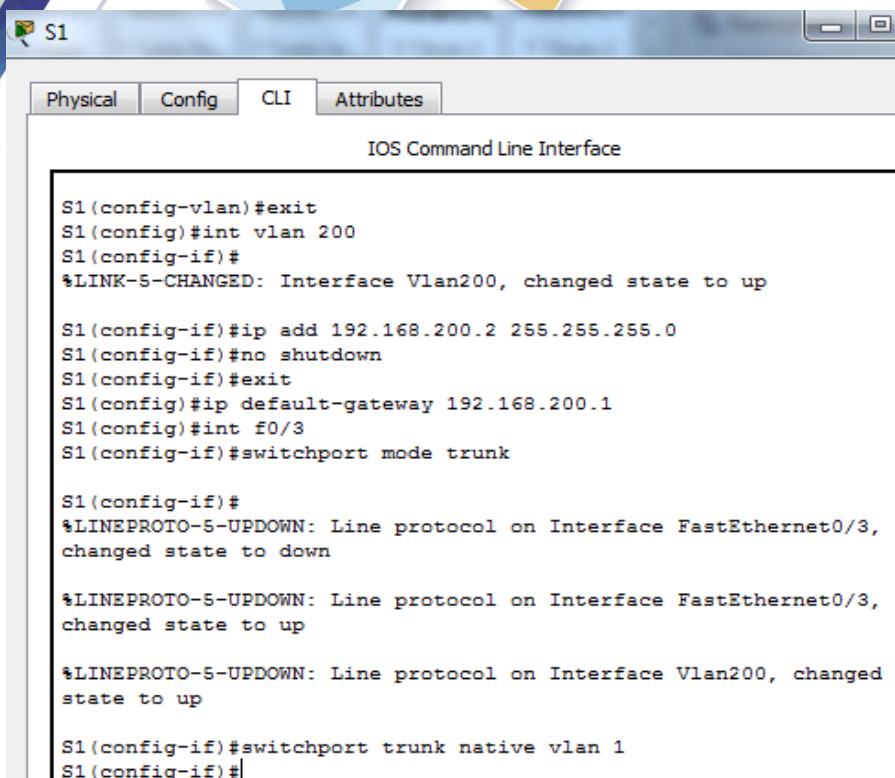
S1
Physical Config CLI Attributes
IOS Command Line Interface

Prohibido Ingreso No autorizado

User Access Verification

Password:

S1>enable
Password:
S1#config t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#vlan 30
S1(config-vlan)#name administracion
S1(config-vlan)#vlan 40
S1(config-vlan)#name Mercado
S1(config-vlan)#vlan 200
S1(config-vlan)#name mantenimiento
S1(config-vlan)#exit
S1(config)#
  
```



S1

Physical Config CLI Attributes

IOS Command Line Interface

```
S1(config-vlan)#exit
S1(config)#int vlan 200
S1(config-if)#
%LINK-5-CHANGED: Interface Vlan200, changed state to up

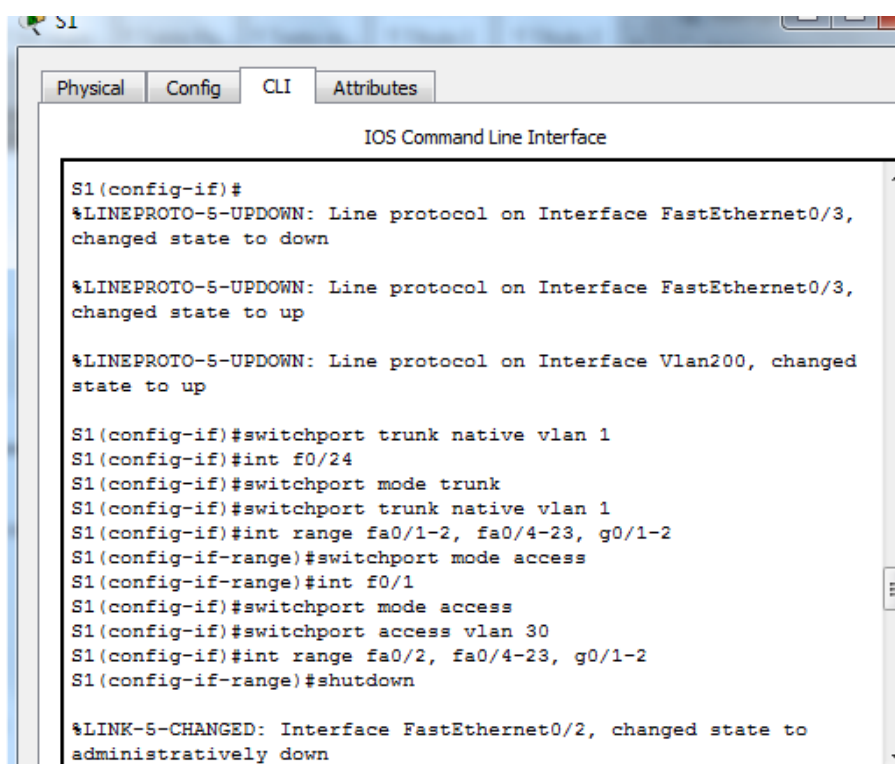
S1(config-if)#ip add 192.168.200.2 255.255.255.0
S1(config-if)#no shutdown
S1(config-if)#exit
S1(config)#ip default-gateway 192.168.200.1
S1(config)#int f0/3
S1(config-if)#switchport mode trunk

S1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3,
changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3,
changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan200, changed
state to up

S1(config-if)#switchport trunk native vlan 1
S1(config-if)#
```



S1

Physical Config CLI Attributes

IOS Command Line Interface

```
S1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3,
changed state to down

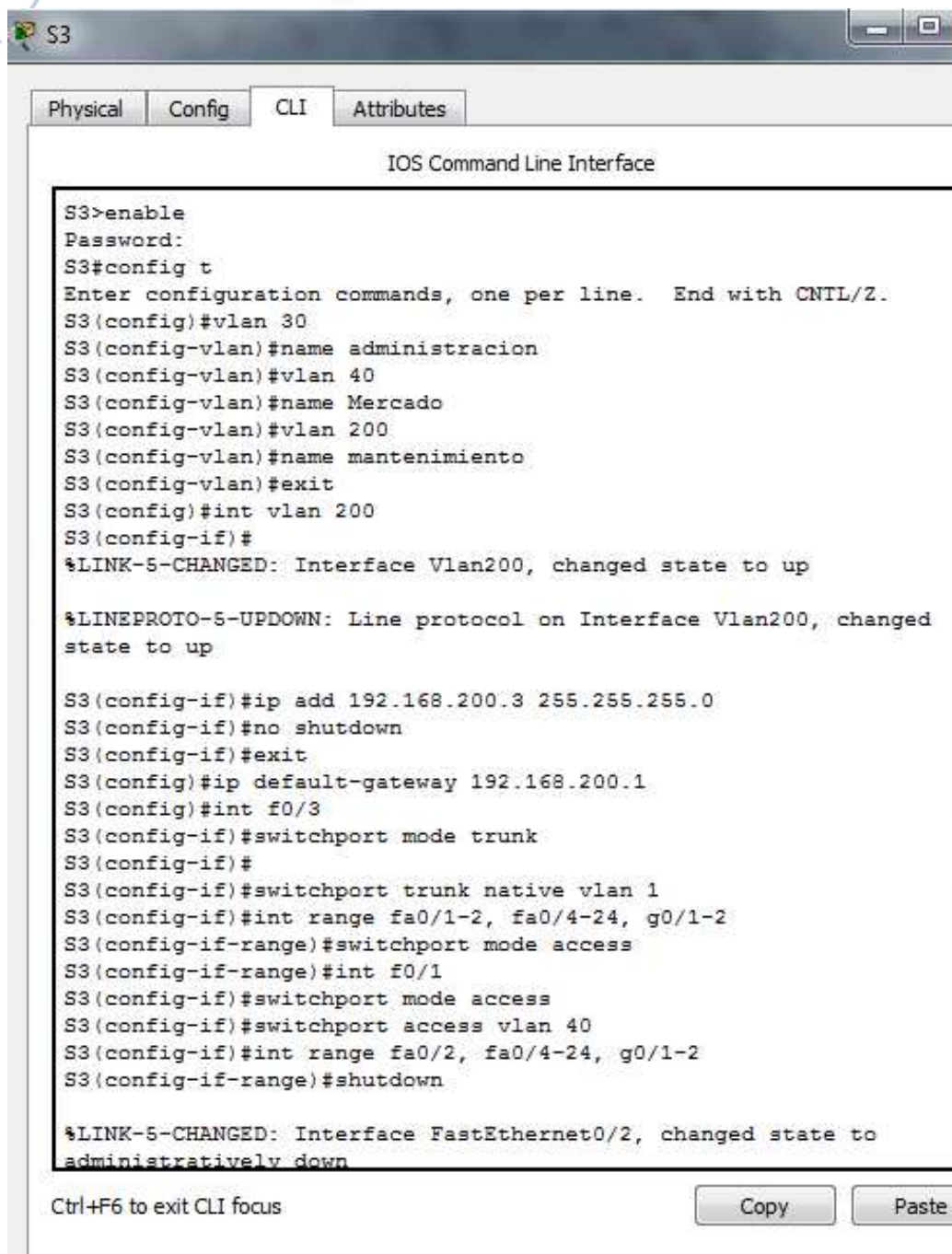
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3,
changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan200, changed
state to up

S1(config-if)#switchport trunk native vlan 1
S1(config-if)#int f0/24
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#int range fa0/1-2, fa0/4-23, g0/1-2
S1(config-if-range)#switchport mode access
S1(config-if-range)#int f0/1
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 30
S1(config-if)#int range fa0/2, fa0/4-23, g0/1-2
S1(config-if-range)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to
administratively down
```

Configuración S3



The screenshot shows a window titled 'S3' with tabs for 'Physical', 'Config', 'CLI', and 'Attributes'. The 'CLI' tab is active, displaying the 'IOS Command Line Interface'. The interface shows a series of configuration commands being entered into the switch S3. The commands include enabling the switch, setting a password, entering configuration mode, creating VLANs 30, 40, and 200 with names 'administracion', 'Mercado', and 'mantenimiento' respectively, exiting configuration mode, entering interface mode for VLAN 200, and enabling the interface. Subsequent commands include adding an IP address (192.168.200.3) with a subnet mask (255.255.255.0), disabling shutdown, setting a default gateway (192.168.200.1), entering interface mode for f0/3, setting it to trunk mode, and configuring native VLAN 1. Finally, a range of interfaces (fa0/1-2, fa0/4-24, g0/1-2) is configured as access ports for VLAN 40, and a range of interfaces (fa0/2, fa0/4-24, g0/1-2) is shut down. Status messages indicate that Interface Vlan200 and Interface FastEthernet0/2 have changed state to up and administratively down, respectively. At the bottom, there is a prompt 'Ctrl+F6 to exit CLI focus' and buttons for 'Copy' and 'Paste'.

```

S3>enable
Password:
S3#config t
Enter configuration commands, one per line.  End with CNTL/Z.
S3(config)#vlan 30
S3(config-vlan)#name administracion
S3(config-vlan)#vlan 40
S3(config-vlan)#name Mercado
S3(config-vlan)#vlan 200
S3(config-vlan)#name mantenimiento
S3(config-vlan)#exit
S3(config)#int vlan 200
S3(config-if)#
%LINK-5-CHANGED: Interface Vlan200, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan200, changed
state to up

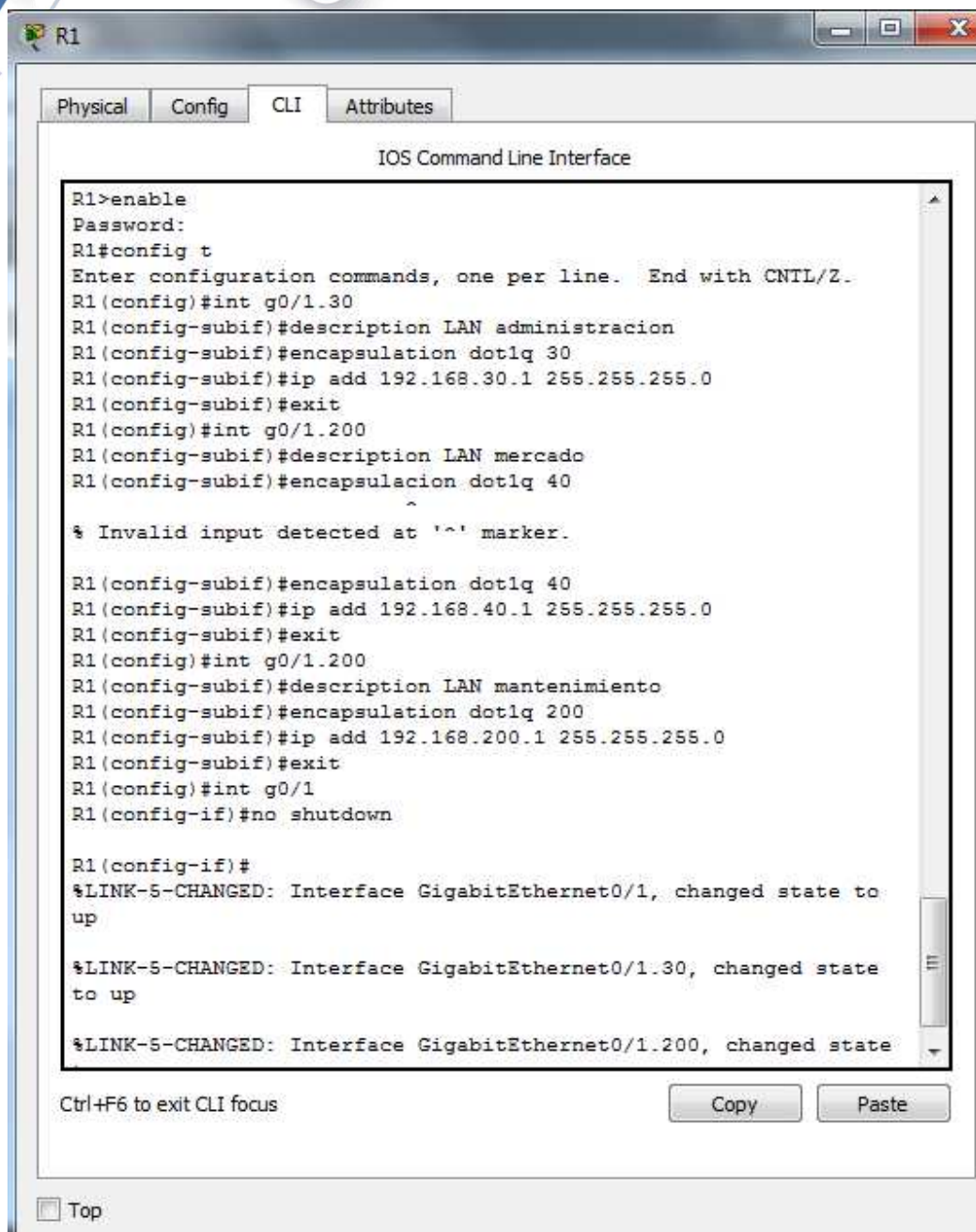
S3(config-if)#ip add 192.168.200.3 255.255.255.0
S3(config-if)#no shutdown
S3(config-if)#exit
S3(config)#ip default-gateway 192.168.200.1
S3(config)#int f0/3
S3(config-if)#switchport mode trunk
S3(config-if)#
S3(config-if)#switchport trunk native vlan 1
S3(config-if)#int range fa0/1-2, fa0/4-24, g0/1-2
S3(config-if-range)#switchport mode access
S3(config-if-range)#int f0/1
S3(config-if)#switchport mode access
S3(config-if)#switchport access vlan 40
S3(config-if)#int range fa0/2, fa0/4-24, g0/1-2
S3(config-if-range)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to
administratively down
  
```

Ctrl+F6 to exit CLI focus

Copy Paste

Configuración R1



The screenshot shows the R1 IOS Command Line Interface with the following configuration steps:

```

R1>enable
Password:
R1#config t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int g0/1.30
R1(config-subif)#description LAN administracion
R1(config-subif)#encapsulation dot1q 30
R1(config-subif)#ip add 192.168.30.1 255.255.255.0
R1(config-subif)#exit
R1(config)#int g0/1.200
R1(config-subif)#description LAN mercado
R1(config-subif)#encapsulation dot1q 40
R1(config-subif)#ip add 192.168.40.1 255.255.255.0
R1(config-subif)#exit
R1(config)#int g0/1.200
R1(config-subif)#description LAN mantenimiento
R1(config-subif)#encapsulation dot1q 200
R1(config-subif)#ip add 192.168.200.1 255.255.255.0
R1(config-subif)#exit
R1(config)#int g0/1
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

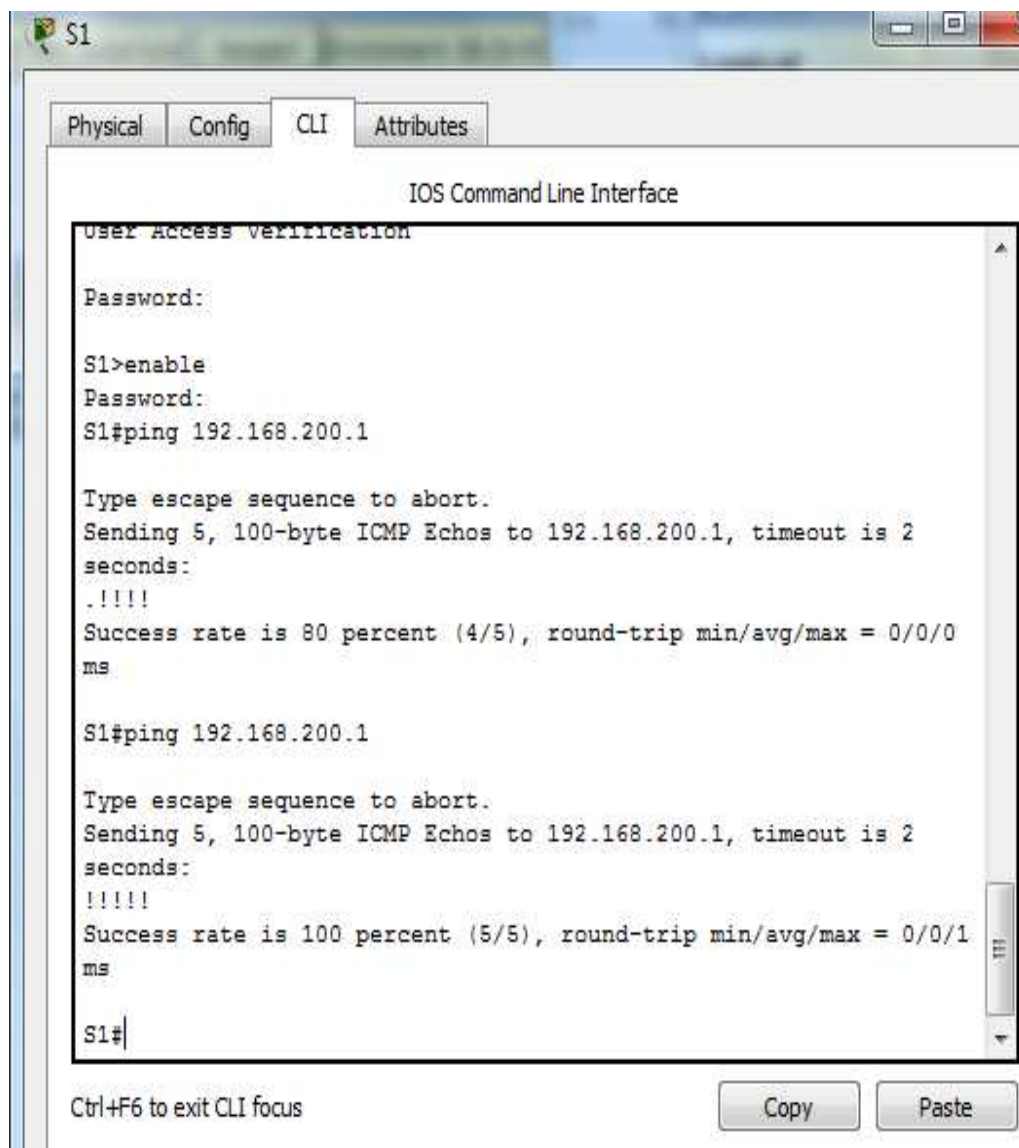
%LINK-5-CHANGED: Interface GigabitEthernet0/1.30, changed state to up

%LINK-5-CHANGED: Interface GigabitEthernet0/1.200, changed state to up
  
```

At the bottom of the window, there is a status bar with the text "Ctrl+F6 to exit CLI focus" and two buttons: "Copy" and "Paste".

Verificación De Conectividad En La Red

Ping de S1 a R1 Dirección VLAN 200



The screenshot shows the CLI interface of a router named S1. The interface has tabs for Physical, Config, CLI, and Attributes. The CLI tab is active, displaying the 'User Access Verification' screen. The user has entered the command 'enable' to enter privileged EXEC mode, followed by 'ping 192.168.200.1'. The output shows a successful ping with a success rate of 100 percent (5/5) and a round-trip time of 0/0/1 ms. The prompt 'S1#' is visible at the bottom of the CLI window.

```
S1>enable
Password:
S1#ping 192.168.200.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.200.1, timeout is 2
seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/0
ms

S1#ping 192.168.200.1

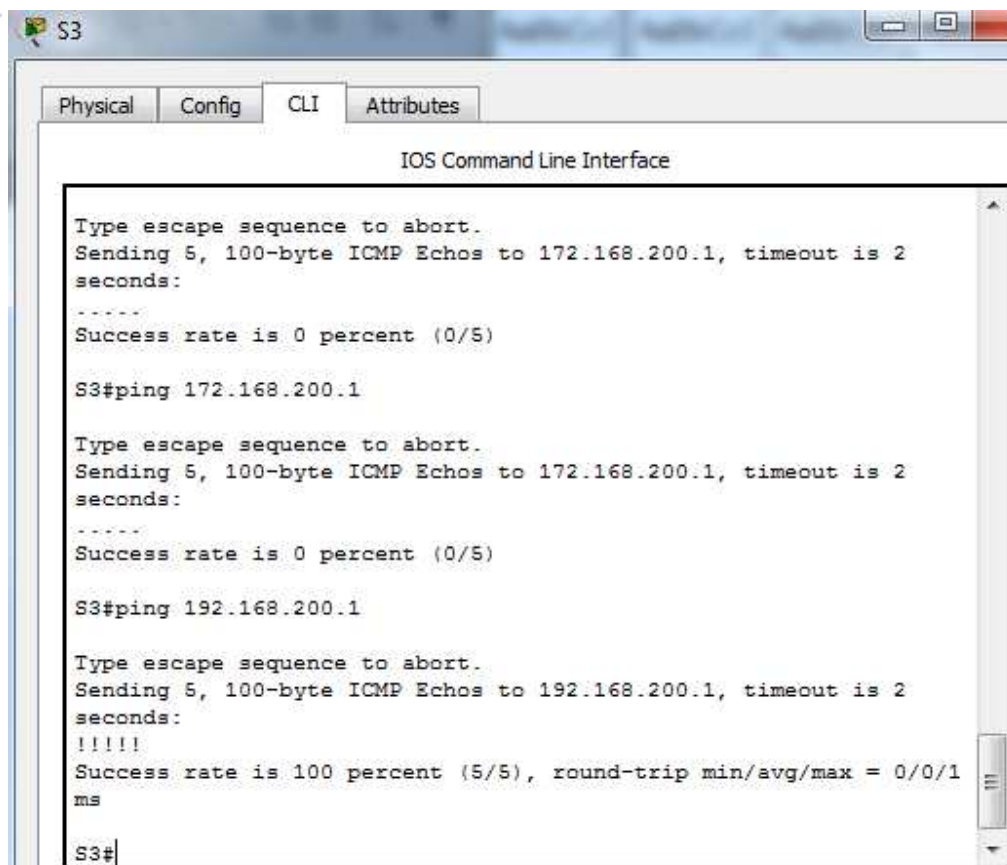
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.200.1, timeout is 2
seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1
ms

S1#
```

Ctrl+F6 to exit CLI focus

Copy Paste

Ping de S3 a R1 Dirección VLAN 200



The screenshot shows the CLI interface of switch S3. The 'CLI' tab is selected. The output of the ping command is as follows:

```

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.168.200.1, timeout is 2
seconds:
.....
Success rate is 0 percent (0/5)

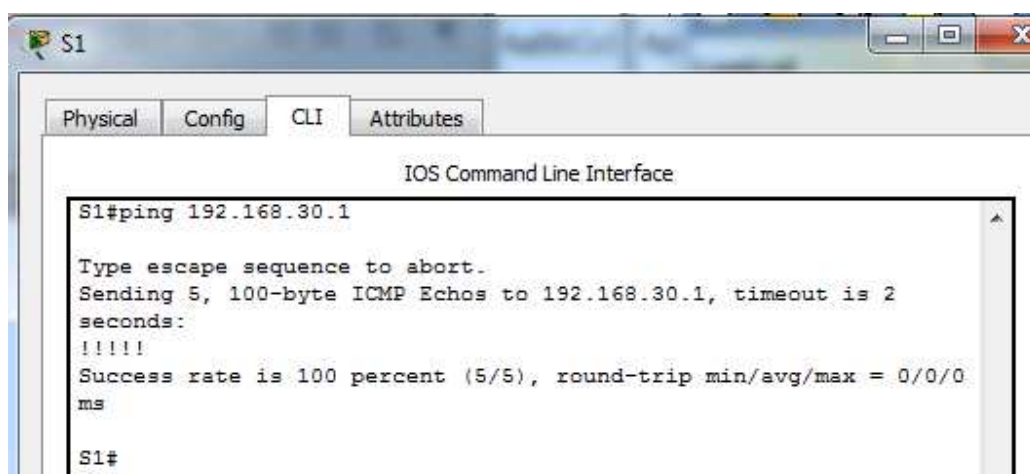
S3#ping 172.168.200.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.168.200.1, timeout is 2
seconds:
.....
Success rate is 0 percent (0/5)

S3#ping 192.168.200.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.200.1, timeout is 2
seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1
ms
S3#
  
```

Ping de S1 a R1 Dirección VLAN 30



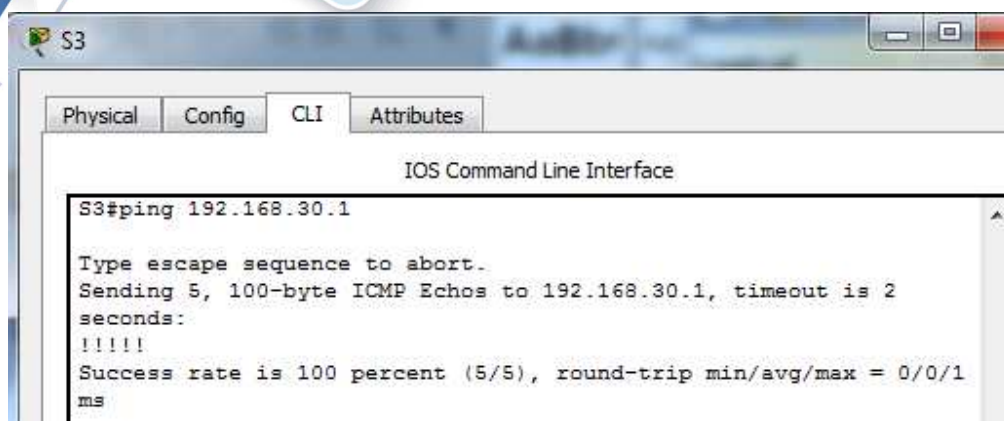
The screenshot shows the CLI interface of switch S1. The 'CLI' tab is selected. The output of the ping command is as follows:

```

S1#ping 192.168.30.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.30.1, timeout is 2
seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0
ms
S1#
  
```

Ping de S3 a R1 Dirección VLAN 30



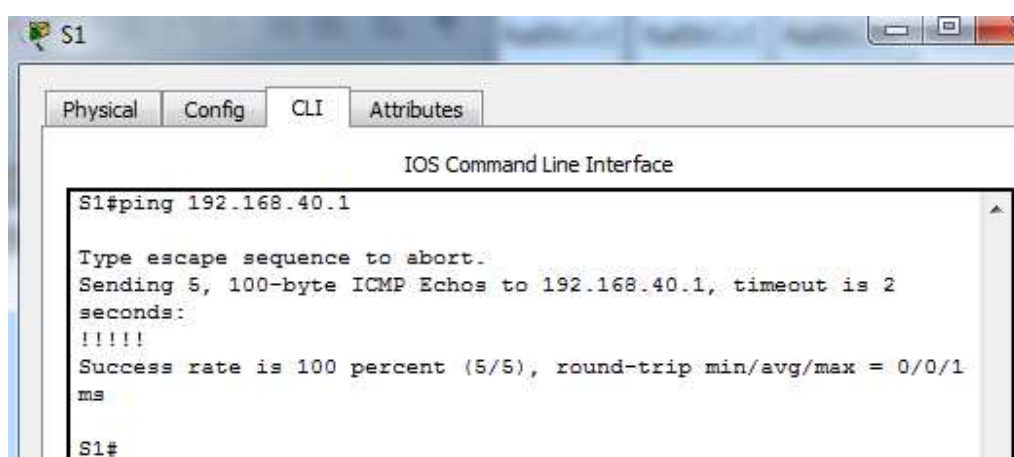
```

S3
-----
Physical Config CLI Attributes
IOS Command Line Interface

S3#ping 192.168.30.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.30.1, timeout is 2
seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1
ms
  
```

Ping de S1 a R1 Dirección VLAN 40



```

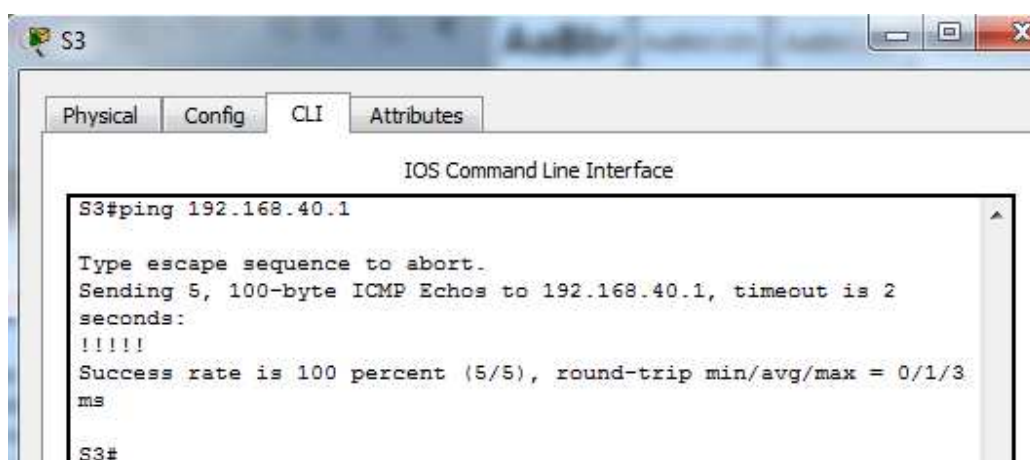
S1
-----
Physical Config CLI Attributes
IOS Command Line Interface

S1#ping 192.168.40.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.40.1, timeout is 2
seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1
ms

S1#
  
```

Ping de S3 a R1 Dirección VLAN 40



```

S3
-----
Physical Config CLI Attributes
IOS Command Line Interface

S3#ping 192.168.40.1

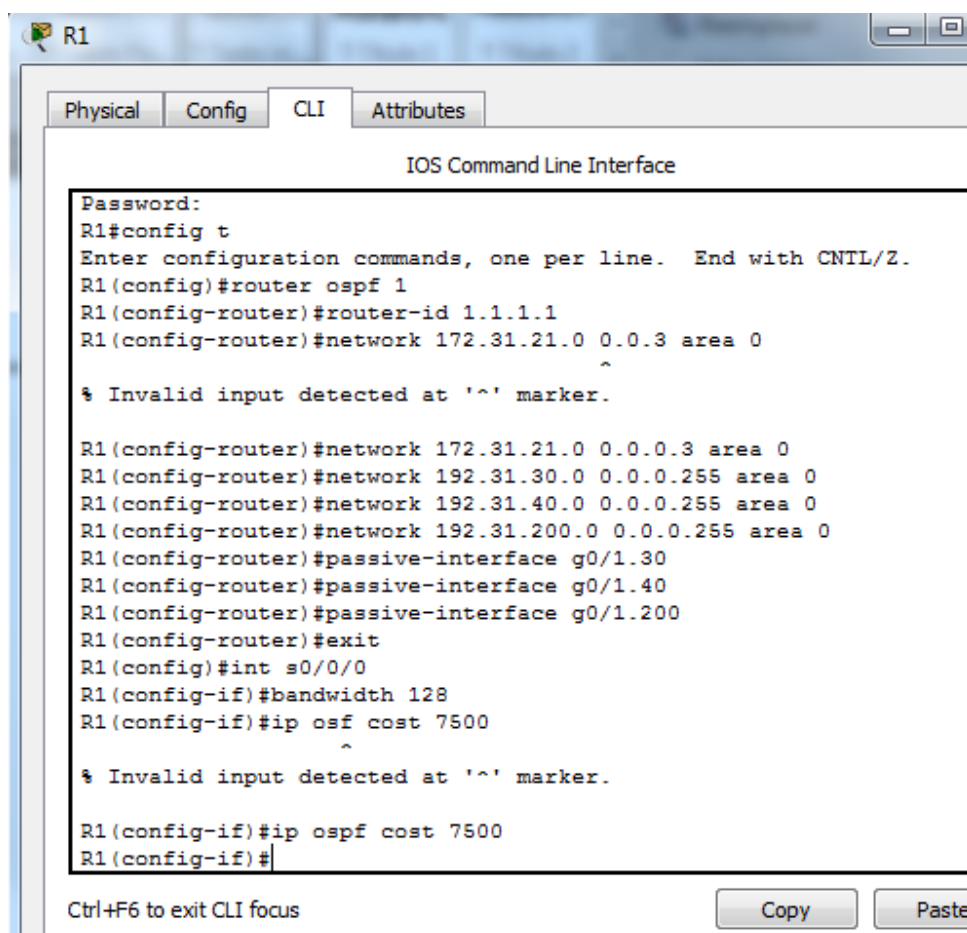
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.40.1, timeout is 2
seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/1/3
ms

S3#
  
```


Configurar el Protocolo de Enrutamiento Dinámico OSPFv2

Tareas de configuración para R1 incluyendo: ID de proceso OSPF, ID de enrutador, anunciar redes conectadas directamente, establecer todas las interfaces LAN como pasivas, cambiar el ancho de banda de referencia de costo predeterminado para admitir cálculos de interfaz Gigabit, establecer el ancho de banda de la interfaz en serie, ajustar el costo métrico de S0/0/0.

Configurando OSPFv2 en R1.



The screenshot shows a window titled 'R1' with tabs for 'Physical', 'Config', 'CLI', and 'Attributes'. The 'CLI' tab is active, displaying the 'IOS Command Line Interface'. The terminal output shows the following commands and responses:

```

Password:
R1#config t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#router-id 1.1.1.1
R1(config-router)#network 172.31.21.0 0.0.3 area 0
^
% Invalid input detected at '^' marker.

R1(config-router)#network 172.31.21.0 0.0.0.3 area 0
R1(config-router)#network 192.31.30.0 0.0.0.255 area 0
R1(config-router)#network 192.31.40.0 0.0.0.255 area 0
R1(config-router)#network 192.31.200.0 0.0.0.255 area 0
R1(config-router)#passive-interface g0/1.30
R1(config-router)#passive-interface g0/1.40
R1(config-router)#passive-interface g0/1.200
R1(config-router)#exit
R1(config)#int s0/0/0
R1(config-if)#bandwidth 128
R1(config-if)#ip ospf cost 7500
^
% Invalid input detected at '^' marker.

R1(config-if)#ip ospf cost 7500
R1(config-if)#
  
```

At the bottom of the window, there is a status bar with the text 'Ctrl+F6 to exit CLI focus' and two buttons: 'Copy' and 'Paste'.

Configurando OSPFv2 en R2.

```

R2>enable
Password:
Password:
Password:

R2>enable
Translating "enable"
% Unknown command or computer name, or unable to find computer
address

R2>enable
Password:
R2#config t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router ospf 1
R2(config-router)#router-id 2.2.2.2
R2(config-router)#network 172.31.21.0 0.0.0.3 area 0
R2(config-router)#network 172.31.23.0 0.0.0.3 area 0
00:59:09: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/0/1
from LOADING to FULL, Loading Done

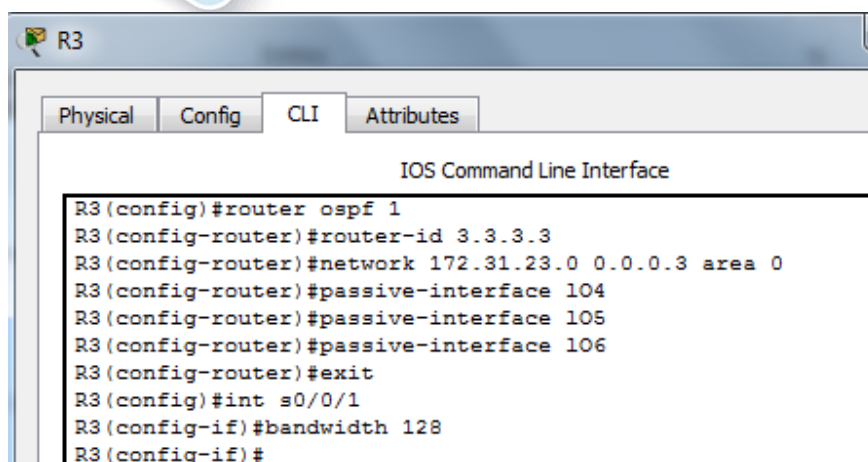
R2(config-router)#network 10.10.10.10 0.0.0.255 area 0
R2(config-router)#passive-interface g0/1
R2(config-router)#exit
R2(config)#int s0/0/0
R2(config-if)#bandwidth 128
R2(config-if)#int s0/0/1
R2(config-if)#bandwidth 128
R2(config-if)#int s0/0/0
R2(config-if)#ip ospf cost 7500
R2(config-if)#
  
```

Ctrl+F6 to exit CLI focus

Copy Paste

Top

Configurando OSPFv2 en R3

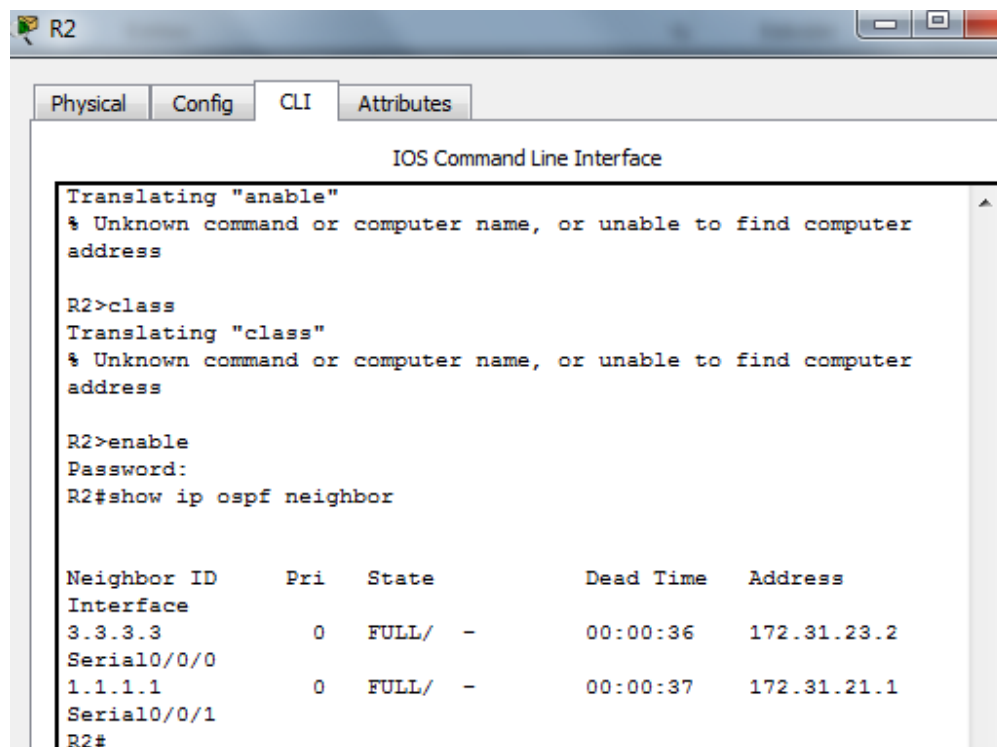


```

R3
Physical Config CLI Attributes
IOS Command Line Interface
R3(config)#router ospf 1
R3(config-router)#router-id 3.3.3.3
R3(config-router)#network 172.31.23.0 0.0.0.3 area 0
R3(config-router)#passive-interface 104
R3(config-router)#passive-interface 105
R3(config-router)#passive-interface 106
R3(config-router)#exit
R3(config)#int s0/0/1
R3(config-if)#bandwidth 128
R3(config-if)#
  
```

Verificación de la Información de OSPF

Routers conectados por OSPFv2



```

R2
Physical Config CLI Attributes
IOS Command Line Interface
Translating "anable"
% Unknown command or computer name, or unable to find computer address
R2>class
Translating "class"
% Unknown command or computer name, or unable to find computer address
R2>enable
Password:
R2#show ip ospf neighbor

Neighbor ID    Pri   State           Dead Time   Address
Interface
3.3.3.3        0     FULL/ -         00:00:36    172.31.23.2
Serial0/0/0
1.1.1.1        0     FULL/ -         00:00:37    172.31.21.1
Serial0/0/1
R2#
  
```


Resumen de las interfaces OSPF que incluye una columna para el Costo de cada Interfaz

```

R2
Physical Config CLI Attributes
IOS Command Line Interface

R2#show ip ospf interface

Serial0/0/1 is up, line protocol is up
  Internet address is 172.31.21.2/30, Area 0
  Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT,
  Cost: 781
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40,
  Retransmit 5
    Hello due in 00:00:07
  Index 1/1, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1 , Adjacent neighbor count is 1
    Adjacent with neighbor 1.1.1.1
  Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
  Internet address is 172.31.23.1/30, Area 0
  Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT,
  Cost: 7500
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40,
  Retransmit 5
    Hello due in 00:00:03
  Index 2/2, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1 , Adjacent neighbor count is 1
    Adjacent with neighbor 3.3.3.3
  Suppress hello for 0 neighbor(s)
GigabitEthernet0/1 is up, line protocol is up
  Internet address is 10.10.10.1/24, Area 0
  
```

```
GigabitEthernet0/1 is up, line protocol is up
Internet address is 10.10.10.1/24, Area 0
Process ID 1, Router ID 2.2.2.2, Network Type BROADCAST, Cost:
1
Transmit Delay is 1 sec, State WAITING, Priority 1
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40,
Retransmit 5
No Hellos (Passive interface)
Index 3/3, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)
R2#
R2#
```

Ctrl+F6 to exit CLI focus

Copy

Paste

OSPF Process ID, Router ID, Address summarizations, Routing Networks, y passive interfaces configuradas en un Router

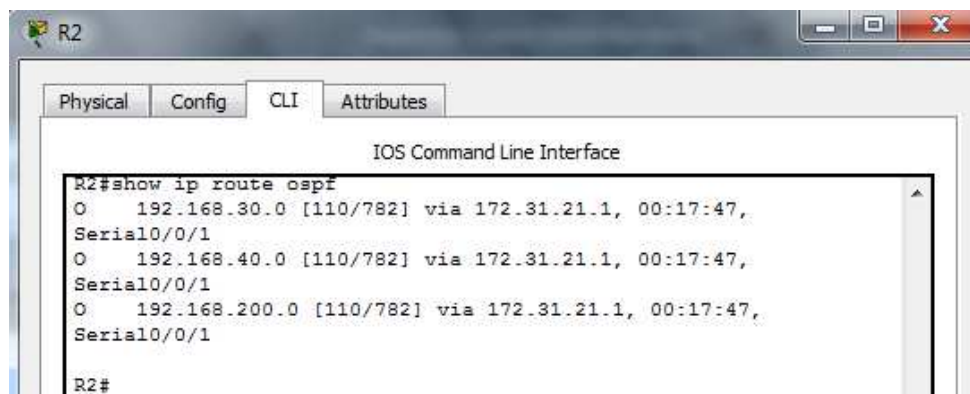
```
R2
Physical Config CLI Attributes
IOS Command Line Interface

R2#show ip protocols

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 2.2.2.2
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.21.0 0.0.0.3 area 0
    172.31.23.0 0.0.0.3 area 0
    10.10.10.0 0.0.0.255 area 0
  Passive Interface(s):
    GigabitEthernet0/1
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1           110          00:16:28
    2.2.2.2           110          00:09:30
    3.3.3.3           110          00:06:44
  Distance: (default is 110)

R2#
```

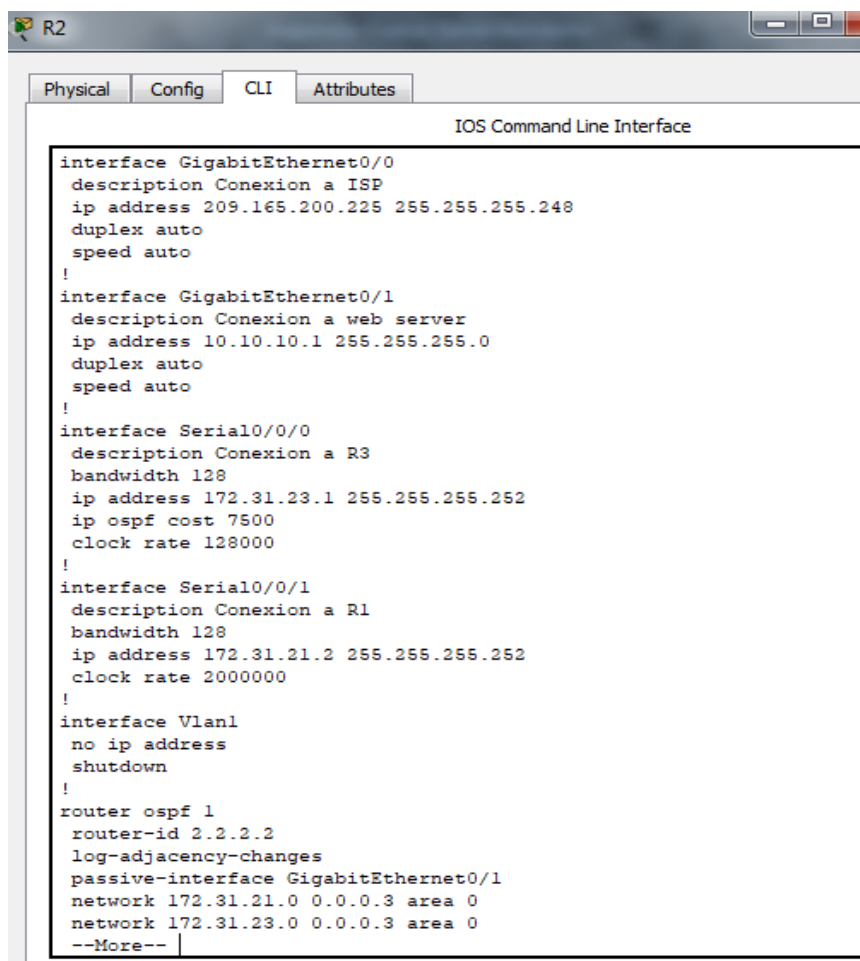
Mostrar solo las rutas OSPF



```

R2#show ip route ospf
O   192.168.30.0 [110/782] via 172.31.21.1, 00:17:47,
    Serial0/0/1
O   192.168.40.0 [110/782] via 172.31.21.1, 00:17:47,
    Serial0/0/1
O   192.168.200.0 [110/782] via 172.31.21.1, 00:17:47,
    Serial0/0/1
R2#
  
```

Sección OSPF de la configuración en ejecución



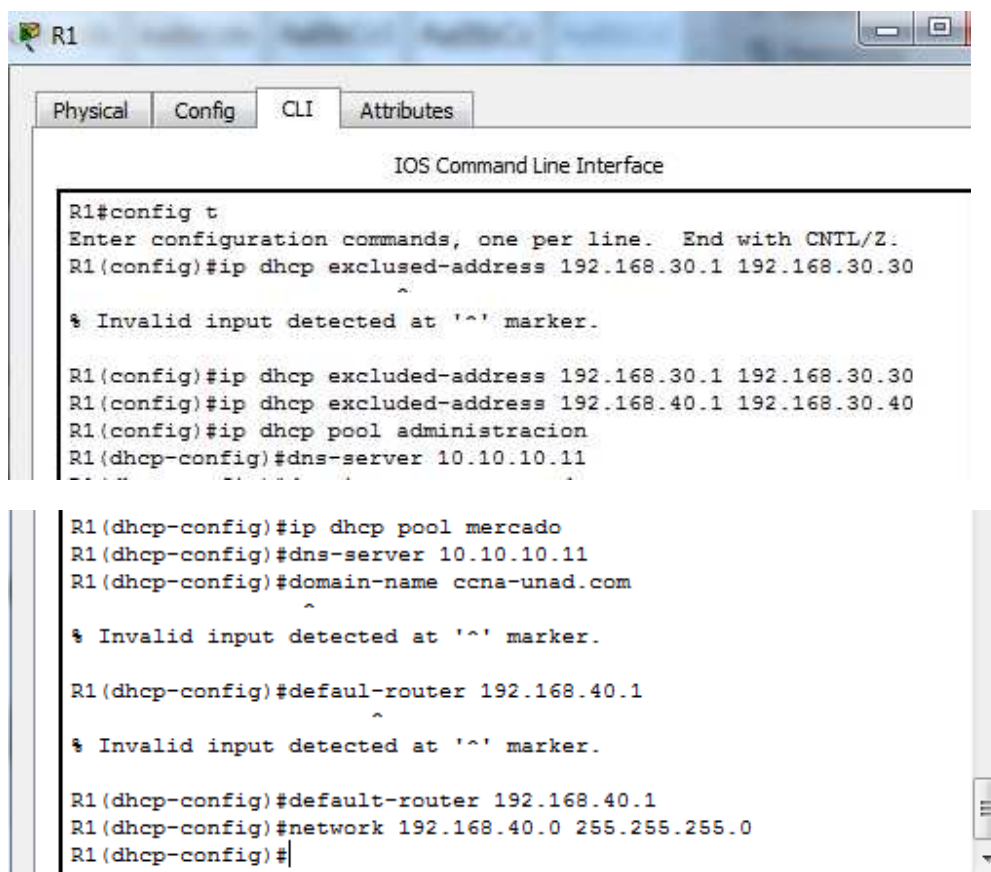
```

interface GigabitEthernet0/0
description Conexion a ISP
ip address 209.165.200.225 255.255.255.248
duplex auto
speed auto
!
interface GigabitEthernet0/1
description Conexion a web server
ip address 10.10.10.1 255.255.255.0
duplex auto
speed auto
!
interface Serial0/0/0
description Conexion a R3
bandwidth 128
ip address 172.31.23.1 255.255.255.252
ip ospf cost 7500
clock rate 128000
!
interface Serial0/0/1
description Conexion a R1
bandwidth 128
ip address 172.31.21.2 255.255.255.252
clock rate 2000000
!
interface Vlan1
no ip address
shutdown
!
router ospf 1
router-id 2.2.2.2
log-adjacency-changes
passive-interface GigabitEthernet0/1
network 172.31.21.0 0.0.0.3 area 0
network 172.31.23.0 0.0.0.3 area 0
--More--
  
```

Implementación Dhcp Y Nat Para Ipv4

Tareas de configuración para R1 incluyendo: Reservar las primeras 30 direcciones IP en la VLAN 30 para configuraciones estáticas, reservar las primeras 30 direcciones IP en la VLAN 40 para configuraciones estáticas, crear una agrupación DHCP para la VLAN 30, crear una agrupación DHCP para la VLAN 40.

Configurando R1 como el servidor DHCP para las VLAN 30 y 40.



```

R1
  Physical  Config  CLI  Attributes
  IOS Command Line Interface

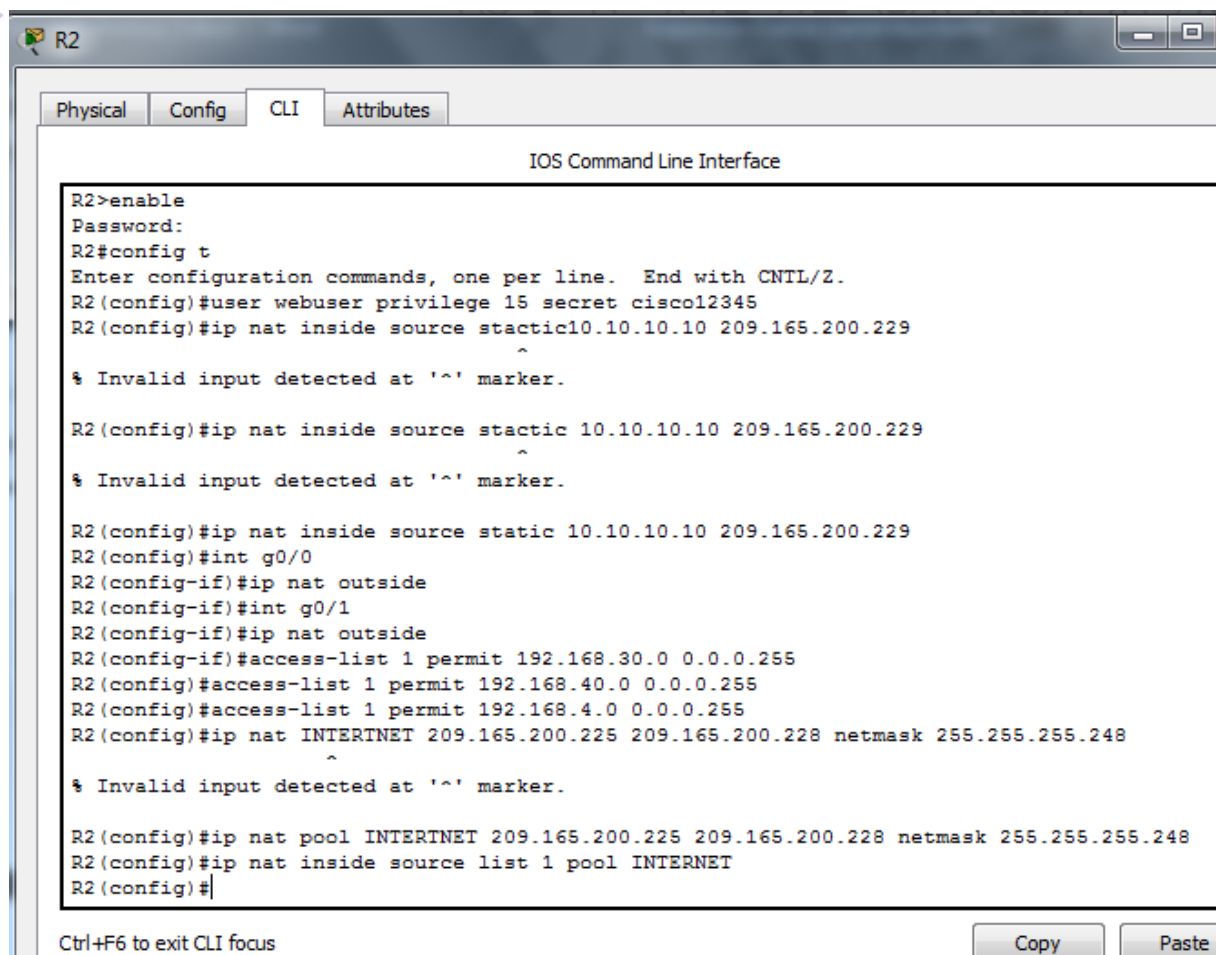
R1#config t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
^
% Invalid input detected at '^' marker.

R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.30.40
R1(config)#ip dhcp pool administracion
R1(dhcp-config)#dns-server 10.10.10.11
^
R1(dhcp-config)#ip dhcp pool mercado
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#domain-name ccna-unad.com
^
% Invalid input detected at '^' marker.

R1(dhcp-config)#default-router 192.168.40.1
^
% Invalid input detected at '^' marker.

R1(dhcp-config)#default-router 192.168.40.1
R1(dhcp-config)#network 192.168.40.0 255.255.255.0
R1(dhcp-config)#
  
```


Configurando NAT Estático y Dinámico en R2.



The screenshot shows a Cisco R2 router CLI window with the following configuration steps:

```

R2>enable
Password:
R2#config t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#user webuser privilege 15 secret cisco12345
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.229
^
% Invalid input detected at '^' marker.

R2(config)#ip nat inside source static 10.10.10.10 209.165.200.229
^
% Invalid input detected at '^' marker.

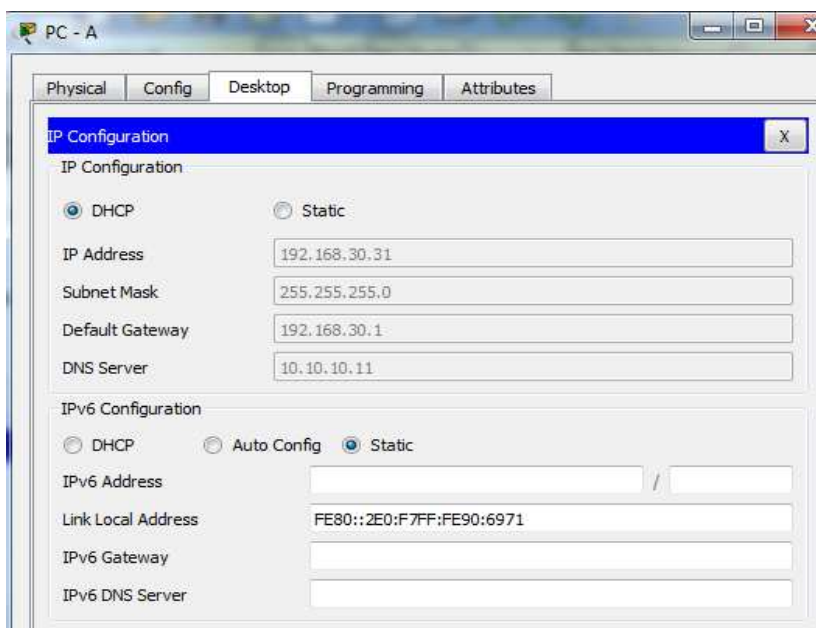
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.229
R2(config)#int g0/0
R2(config-if)#ip nat outside
R2(config-if)#int g0/1
R2(config-if)#ip nat outside
R2(config-if)#access-list 1 permit 192.168.30.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.40.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.4.0 0.0.0.255
R2(config)#ip nat INTERNET 209.165.200.225 209.165.200.228 netmask 255.255.255.248
^
% Invalid input detected at '^' marker.

R2(config)#ip nat pool INTERNET 209.165.200.225 209.165.200.228 netmask 255.255.255.248
R2(config)#ip nat inside source list 1 pool INTERNET
R2(config)#
  
```

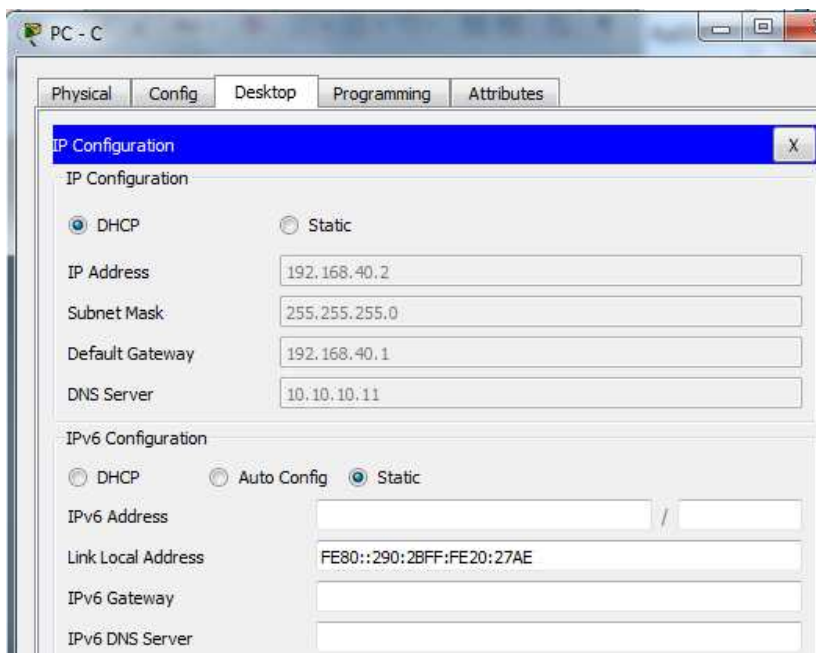
At the bottom of the window, there is a status bar with the text "Ctrl+F6 to exit CLI focus" and two buttons: "Copy" and "Paste".

Verificando Dhcp Y Nat Estática.

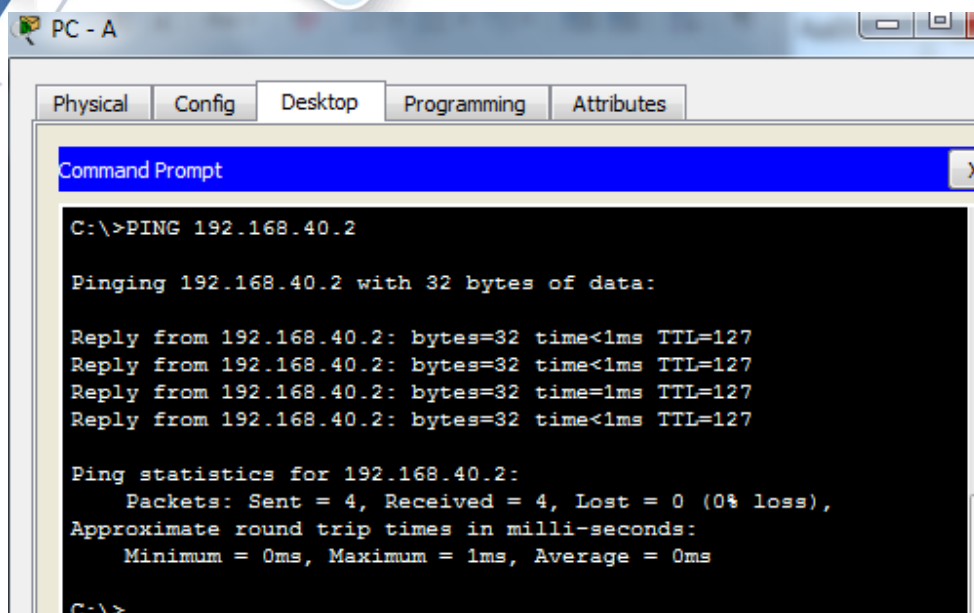
Verificando que la PC-A haya adquirido la información IP del servidor DHCP



Verificando que la PC-C haya adquirido la información IP del servidor DHCP



Comprobación Ping De Pc-A A Pc-C.



```

PC - A
Physical Config Desktop Programming Attributes
Command Prompt
C:\>PING 192.168.40.2

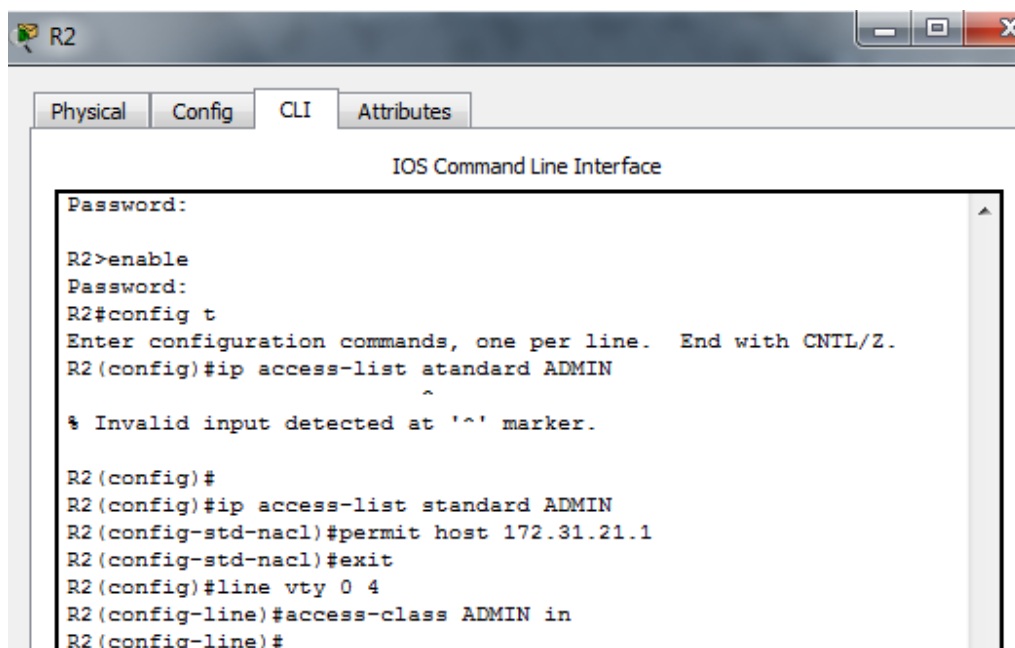
Pinging 192.168.40.2 with 32 bytes of data:

Reply from 192.168.40.2: bytes=32 time<1ms TTL=127
Reply from 192.168.40.2: bytes=32 time<1ms TTL=127
Reply from 192.168.40.2: bytes=32 time=1ms TTL=127
Reply from 192.168.40.2: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.40.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
  
```

Configuración Y Verificación De Listas De Control De Acceso (Acl) Restringiendo El Acceso A Las Líneas Vty En R2

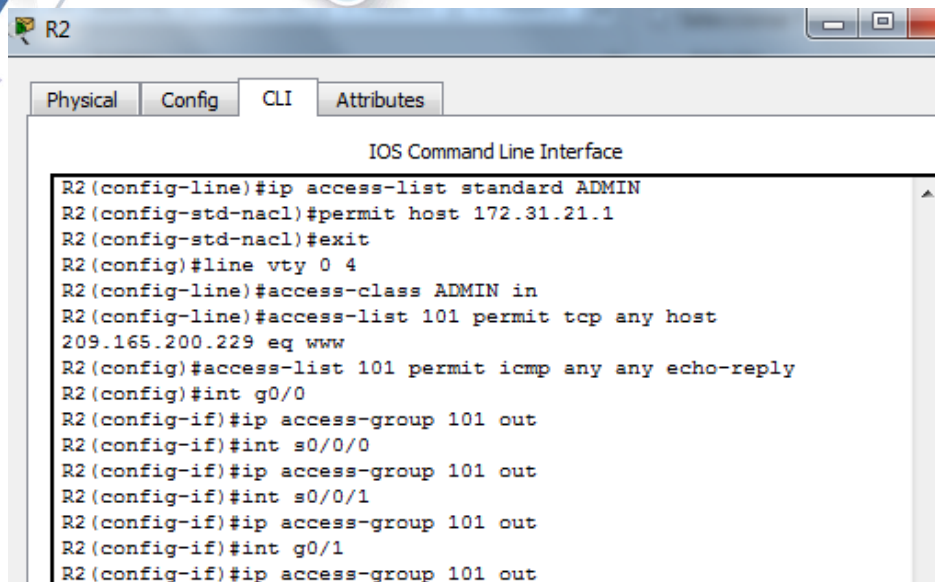


```

R2
Physical Config CLI Attributes
IOS Command Line Interface
Password:
R2>enable
Password:
R2#config t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip access-list atandard ADMIN
      ^
% Invalid input detected at '^' marker.

R2(config)#
R2(config)#ip access-list standard ADMIN
R2(config-std-nacl)#permit host 172.31.21.1
R2(config-std-nacl)#exit
R2(config)#line vty 0 4
R2(config-line)#access-class ADMIN in
R2(config-line)#
  
```


Asegurando la Red del Tráfico de Internet

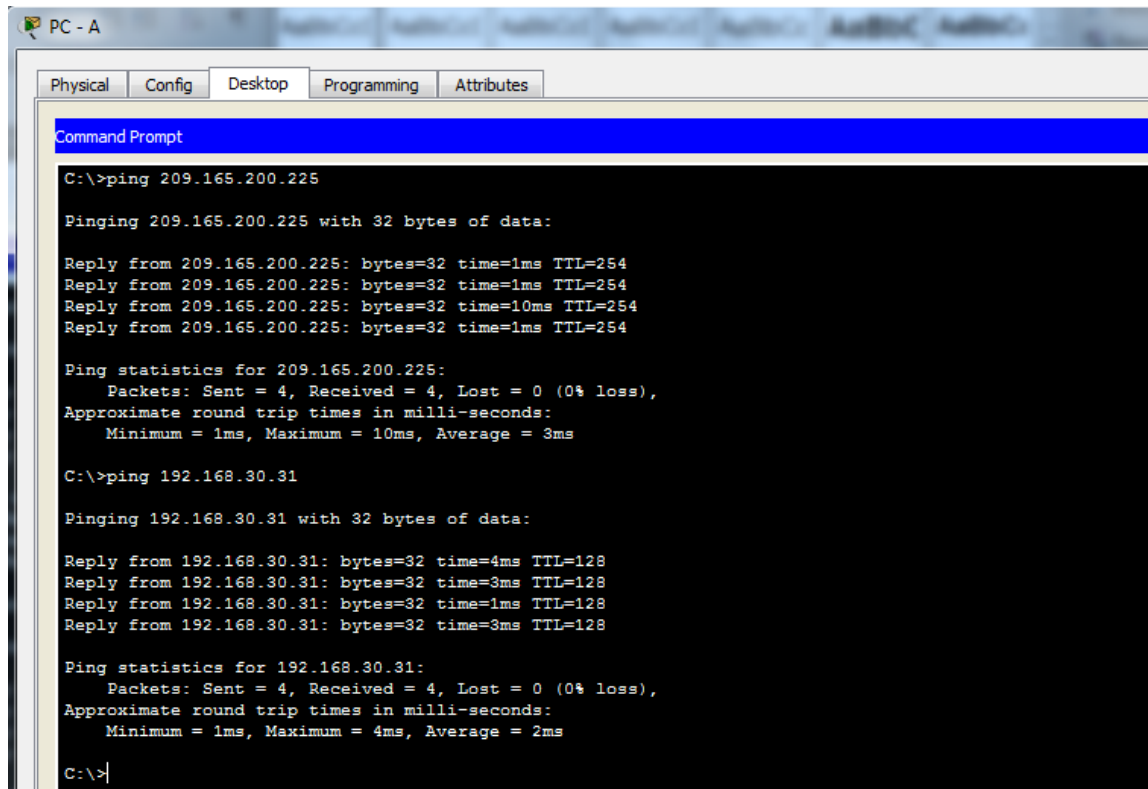


```

R2
Physical Config CLI Attributes
IOS Command Line Interface
R2(config-line)#ip access-list standard ADMIN
R2(config-std-nacl)#permit host 172.31.21.1
R2(config-std-nacl)#exit
R2(config)#line vty 0 4
R2(config-line)#access-class ADMIN in
R2(config-line)#access-list 101 permit tcp any host
209.165.200.229 eq www
R2(config)#access-list 101 permit icmp any any echo-reply
R2(config)#int g0/0
R2(config-if)#ip access-group 101 out
R2(config-if)#int s0/0/0
R2(config-if)#ip access-group 101 out
R2(config-if)#int s0/0/1
R2(config-if)#ip access-group 101 out
R2(config-if)#int g0/1
R2(config-if)#ip access-group 101 out
  
```

Verificando Que La Acl Esté Funcionando

Ping PC-A (Ping debería ser inalcanzable)



```

PC - A
Physical Config Desktop Programming Attributes
Command Prompt
C:\>ping 209.165.200.225

Pinging 209.165.200.225 with 32 bytes of data:

Reply from 209.165.200.225: bytes=32 time=1ms TTL=254
Reply from 209.165.200.225: bytes=32 time=1ms TTL=254
Reply from 209.165.200.225: bytes=32 time=10ms TTL=254
Reply from 209.165.200.225: bytes=32 time=1ms TTL=254

Ping statistics for 209.165.200.225:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 10ms, Average = 3ms

C:\>ping 192.168.30.31

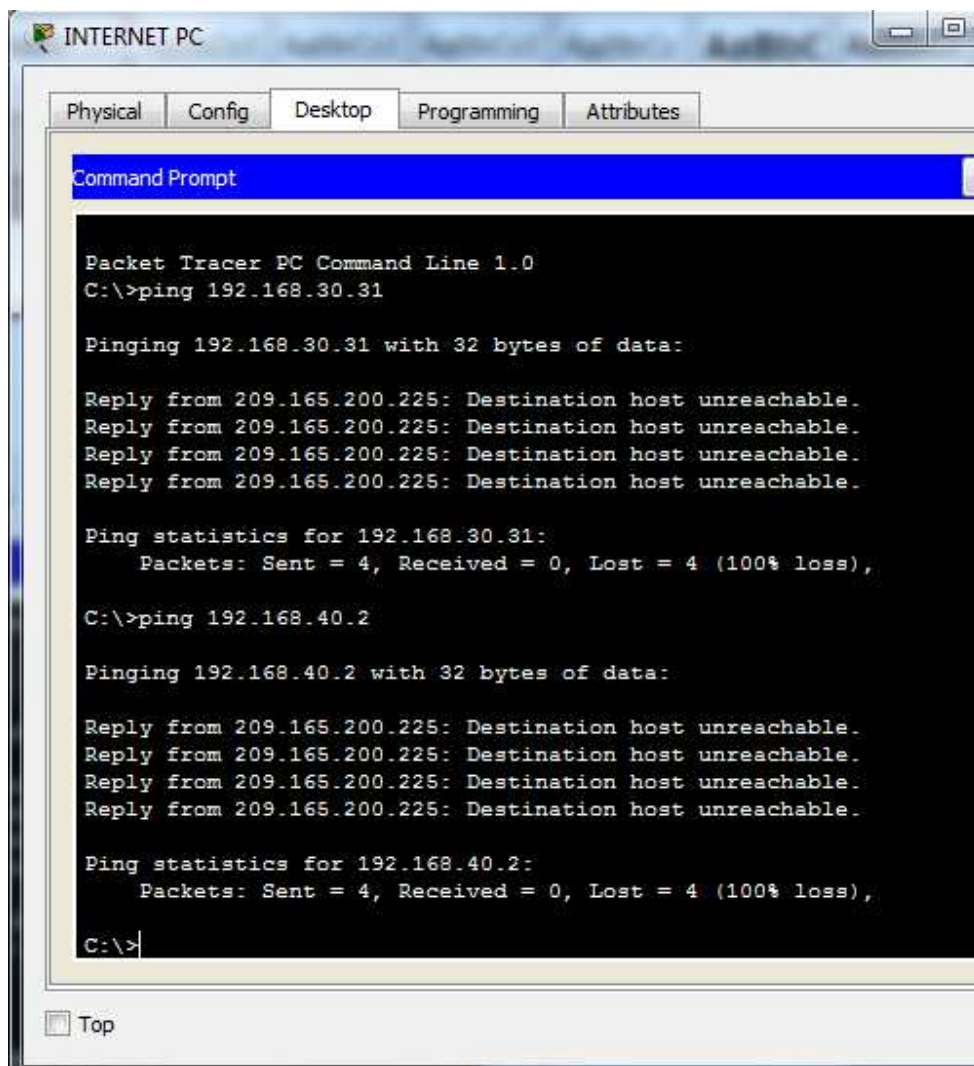
Pinging 192.168.30.31 with 32 bytes of data:

Reply from 192.168.30.31: bytes=32 time=4ms TTL=128
Reply from 192.168.30.31: bytes=32 time=3ms TTL=128
Reply from 192.168.30.31: bytes=32 time=1ms TTL=128
Reply from 192.168.30.31: bytes=32 time=3ms TTL=128

Ping statistics for 192.168.30.31:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 4ms, Average = 2ms

C:\>
  
```

Ping PC-B (Ping debería ser inalcanzable)



The screenshot shows a Packet Tracer PC Command Line window titled "INTERNET PC". The window has tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes". The "Desktop" tab is active, displaying a "Command Prompt" window. The command prompt shows the following text:

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.30.31

Pinging 192.168.30.31 with 32 bytes of data:

Reply from 209.165.200.225: Destination host unreachable.
Reply from 209.165.200.225: Destination host unreachable.
Reply from 209.165.200.225: Destination host unreachable.
Reply from 209.165.200.225: Destination host unreachable.

Ping statistics for 192.168.30.31:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.40.2

Pinging 192.168.40.2 with 32 bytes of data:

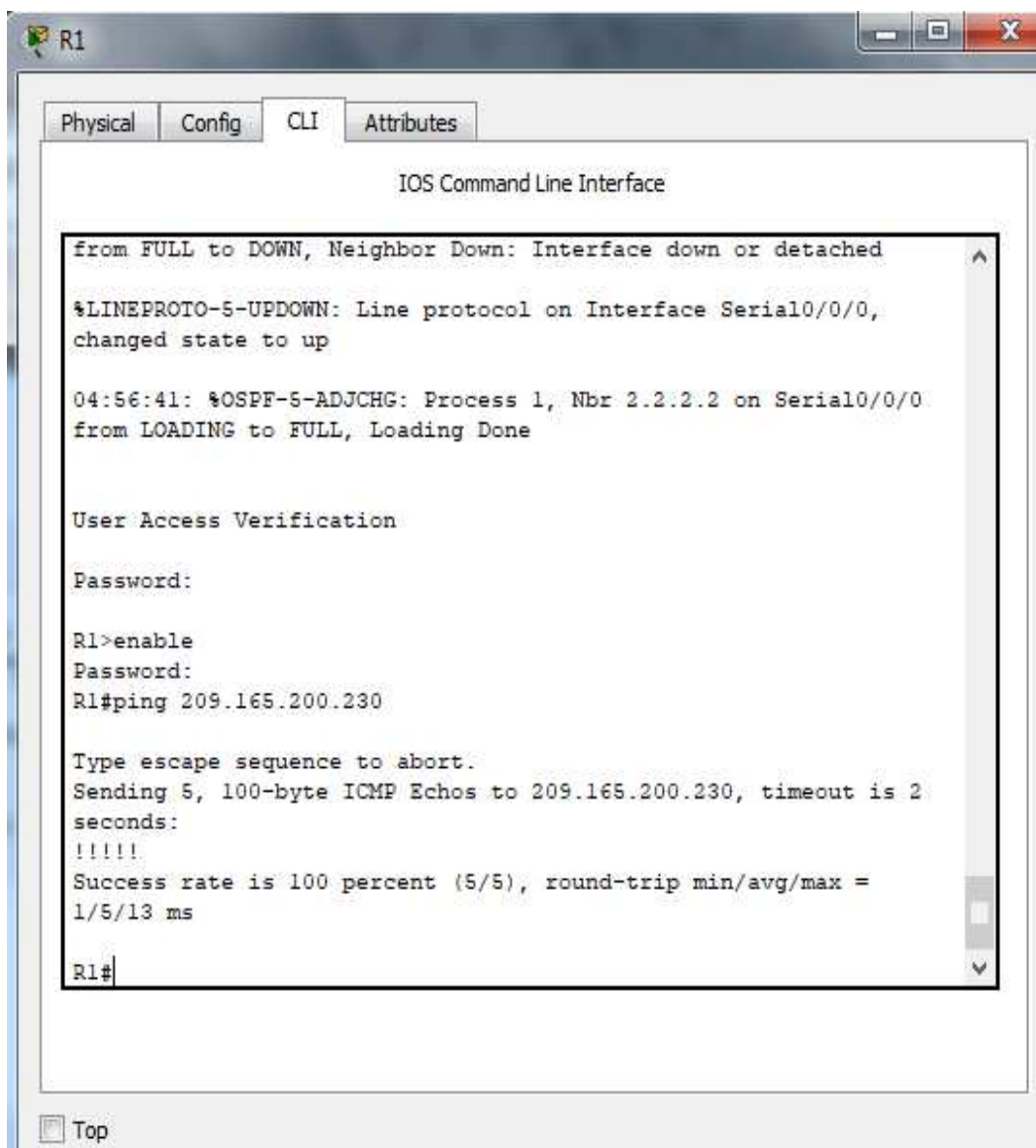
Reply from 209.165.200.225: Destination host unreachable.
Reply from 209.165.200.225: Destination host unreachable.
Reply from 209.165.200.225: Destination host unreachable.
Reply from 209.165.200.225: Destination host unreachable.

Ping statistics for 192.168.40.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

At the bottom of the window, there is a "Top" button.

Desde R1, Ping a la Internet PC (Ping debería tener éxito).



The screenshot shows the R1 IOS Command Line Interface with the following text:

```

from FULL to DOWN, Neighbor Down: Interface down or detached
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0,
changed state to up
04:56:41: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial0/0/0
from LOADING to FULL, Loading Done

User Access Verification

Password:

R1>enable
Password:
R1#ping 209.165.200.230

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.165.200.230, timeout is 2
seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max =
1/5/13 ms
R1#
  
```

At the bottom left of the window, there is a "Top" button.

Verificación De La Información De Las Acls

Coincidencias que han recibido las listas de acceso

```
R2
Physical Config CLI Attributes
IOS Command Line Interface

Prohibido Ingreso No autorizado

User Access Verification

Password:

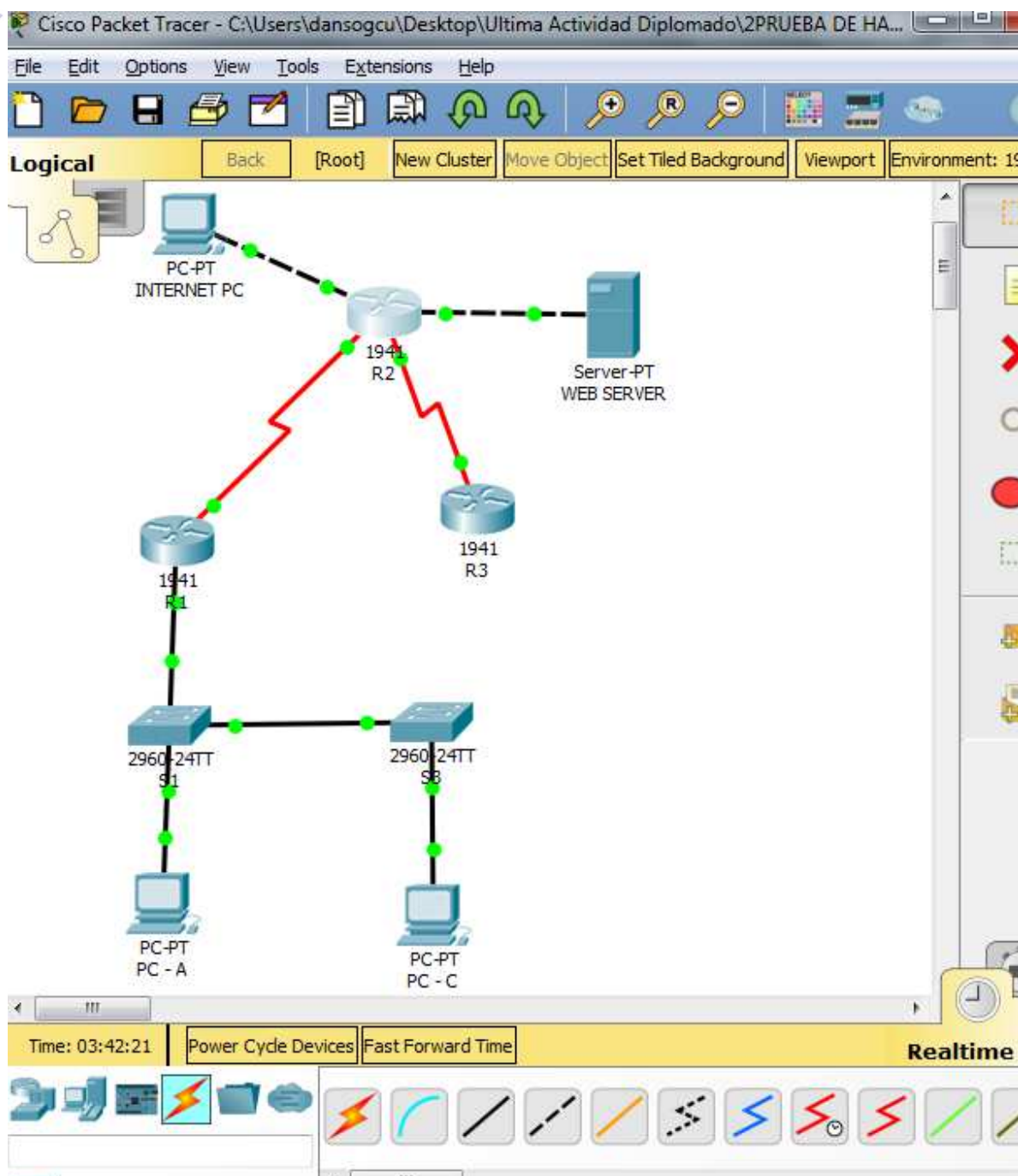
R2>enable
Password:
Password:
R2# show access-lists
Standard IP access list 1
  10 permit 192.168.30.0 0.0.0.255
  20 permit 192.168.40.0 0.0.0.255
  30 permit 192.168.4.0 0.0.0.255
Standard IP access list ADMIN
  10 permit host 172.31.21.1
Extended IP access list 101
  10 permit tcp any host 209.165.200.229 eq www
  20 permit icmp any any echo-reply
R2#
```

Ctrl+F6 to exit CLI focus

Copy Paste

☐ Top

Diagrama De La Topología De Red (Funcionando)





Conclusiones

Al finalizar la actividad logramos concluir que, mediante el desarrollo de la prueba final de habilidades, empleamos todos los conocimientos, destrezas y herramientas que nos brindaron mediante la realización de este diplomado, en el desarrollo de los módulos establecidos, Network Fundamentals (CCNA1 R&S) y Routing and Switching Fundamentals (CCNA2 R&S). y con los cuales pudimos profundizar de manera detallada el campo de las redes y telecomunicaciones.

Este conocimiento es muy esencial y enriquecedor para nuestra carrera de Ingeniería de Sistemas, donde nos catapulta los conocimientos adquiridos y mediante los cuales desarrollamos nuevas competencias en nuestra formación como profesionales y de gran utilidad en el campo laboral.



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